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FOOD ENGINEERING

MAY 1957

VOL 29 NO. 5

PACKAGING

REPORT: Packaging Show Unveils 43 Real Cost Cutters 86
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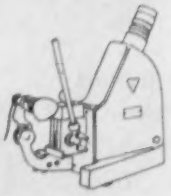

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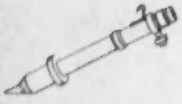

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John Ziemba in Action

When FE's Midwest editor is casing a food equipment show for the new and the better, he looks into everything, literally. No superficial editor, John. His perception is as deep, and his study as broad, as his expert knowledge of our industry.

Blessed with the eagerness of a good editor and the energy of a fast-moving field man, Mr. Ziemba knows what's coming. And you may be interested in one of his predictions:

"Difficult-to-handle food materials are going to be comminuted in the future to make them efficiently workable. Then they will be mixed with additives and formed to a practical shape and size by extrusion or molding. And it will all be done continuously and automatically."

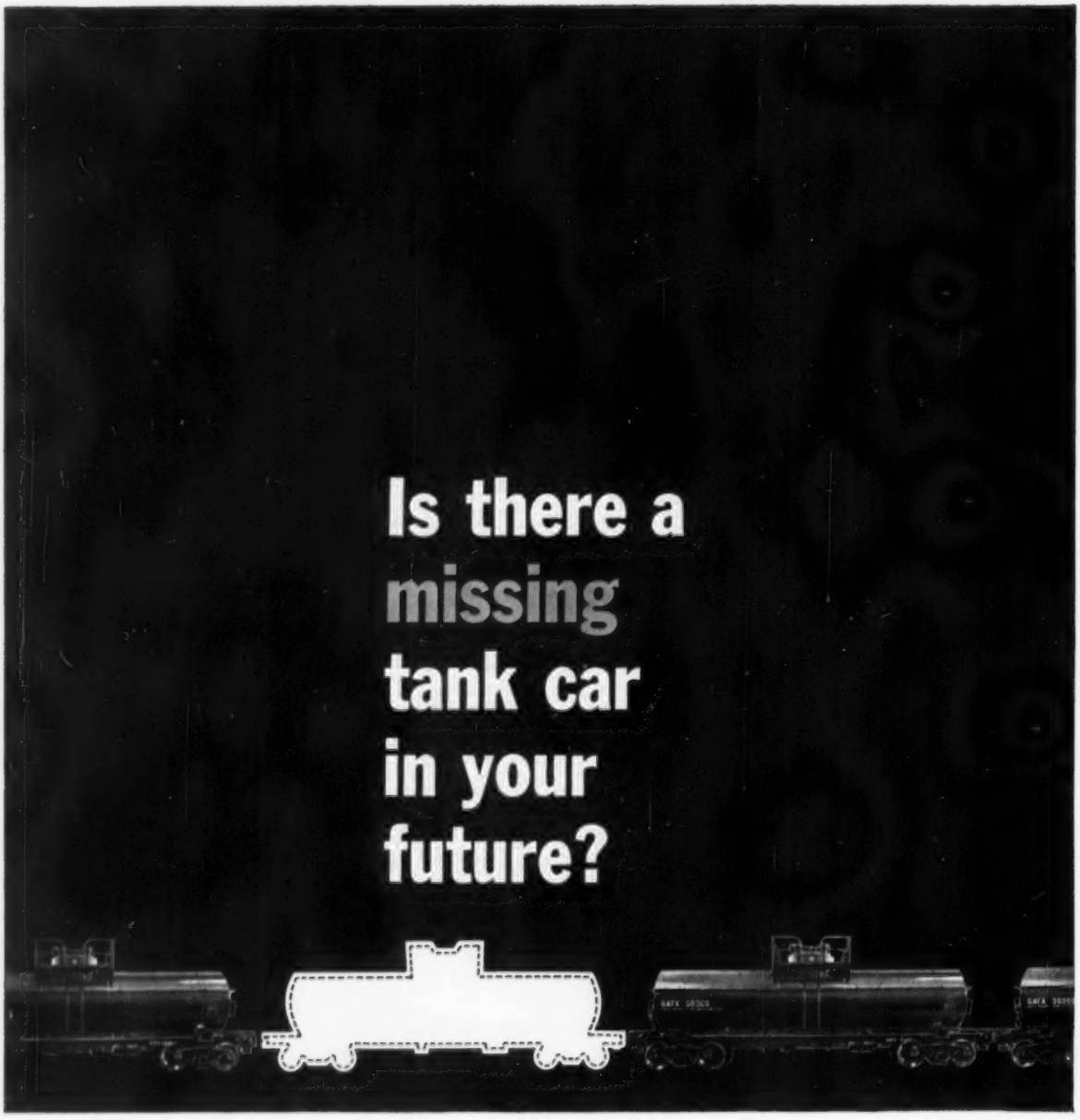
Frozen Sponge Fish

Or perhaps you would like him to explain why you can't successfully freeze hake. The answer comes from one problem in his 10 years of varied experience in food manufacturing and processing before he joined the FE staff 11 years ago:

"When a hake fillet is frozen, then defrosted and refrozen—as might well happen in distribution channels—the fillet acts like a sponge. You literally can wring water out of it. And it fries down to about one-third size and gets tough as leather."

Of course, John is a Question & Answer man by trade, it being one of his assignments to handle that popular department in FE. And he frequently is consulted for technical advice during his travels in the field, or in his Chicago office. In turn for such help, he gets exclusive articles—like one now in the works on advanced unit operations in a new bakery.

Want to see a small sample of John's high-volume, top-quality service to FE readers? Turn to the report on the packaging exposition, page 86. Yes, he's a packaging specialist, too.



That's almost certain to be the plight of companies who don't plan for their tank car requirements in the decade ahead. It's no secret that available general-purpose tank cars are going to be limited. With normal obsolescence of today's facilities, the continuing steel shortage, and with forecasts pointing to a more than 50% expansion in our economy, *liquid product shipments may be difficult . . . may miss tomorrow's sales opportunities.*

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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

At a high level through the first quarter, business looks good for the months ahead. Gross national product likely will be even higher in the last half of the year, and there may be a boom in consumer business.

Personal income increased $11 billion (annual rate) in 6 months ending in March. Further gains are ahead because 5 million workers will automatically get 6 to 8-cent wage increases this year.

Food and beverage manufacturers will spend $913 million for new plants and equipment this year, 14% more than in 1956, a new McGraw-Hill survey reveals. Preliminary plans indicate $795 million in '58; $754 million in '59, and $736 million in '60. All manufacturing's capital outlay is up 14% for '57.

Net income of leading food manufacturers increased significantly in 1956. Percent changes by branches are: Baking (18 firms), 4%; dairy products (12), 9%; meat packing (15), 10%; sugar refining (23), 24%; soft drinks (15), 2%; other foods (85), 6%. Profit margins increased slightly.

Many American food companies with foreign plants report increases in business abroad. And more firms are establishing foreign operations. The Heinz business in Britain has doubled every four years since the war.

With 12% fewer man-hours, value added by manufacture was upped 54% in the biscuit and cracker field from '47 to '54. Canning, preserving, and freezing boosted value added 35%, with 12% fewer total employees. Poultry packers more than tripled value added with 114% more employees.

Cocoa to Remain Cheap

Food manufacturers using cocoa and chocolate as ingredients can continue to smile for a long time. Since taking a beating on the price in 1954, they have enjoyed steadily declining prices. And cocoa futures were in the very low 25 to 20 cent per pound range in the first quarter of 1957.

That the price will stay very favorable is indicated by the fact that the production in the 1956-57 period may be 50,000 or more tons in excess of world consumption. This would bring world stocks to 445,000 long tons, compared to 230 in 1953-54.

At the end of this year, world stocks may exceed the past year's consumption by 54%, compared to 51% a year earlier.

World use of cocoa declined from 780,000 tons in '52-53 to 700,000 in '54-55, then rose to an estimated 835,000 for the current period. Production equaled consumption in '52-53, but now is 885,000 tons.

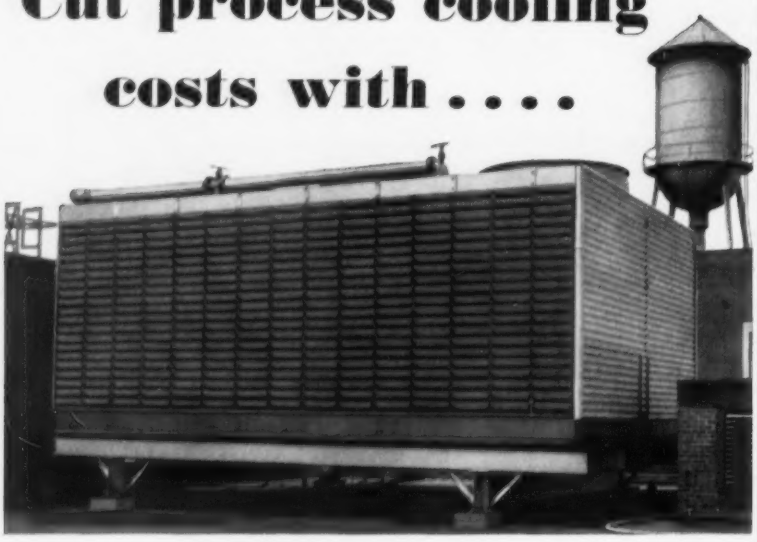
118 New Sugar Mills

Sugar surpluses are virtually eliminated, leaving closer balance between supply and demand than has been seen in many years.

But new sugar mills are being built, and old ones remodeled, in all parts of the world, USDA reports. The Far East will have 70 new mills, with a probable production of 1.6 million short tons of sugar, raw value. The Near East is building 17 mills, Africa plans 9, South America 12, North America 5.

Europe, which is increasing sugar

Cut process cooling costs with....



Marley Double-Flow Aquatowers*

In food processing plants there is an increasingly popular way to provide process cooling water at lower cost. The answer is Marley's Double-Flow Aquatower, an intermediate-capacity cooling tower that combines top performance, operational flexibility, power economy and minimum maintenance — all in one trim package.

The unit pictured is a 2-cell Double-Flow Aquatower — a unit unequalled in the field of intermediate-capacity cooling for performance and *flexibility*. The operator has as many options as there are varying cooling requirements. He can shut down either cell for routine maintenance while the other continues to operate. Water loading can be varied as desired with no reduction in performance. Pump horsepower requirements, too, are always held to a minimum by the low silhouette design and Marley's unique distribution system.

The Double-Flow Aquatower's flexibility and big-time performance with small-time upkeep makes it a natural for food processing plants. Write today for information — or better yet, simply call your nearby Marley Engineering Sales Office in any of 55 cities.

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MARLEY

The Marley Company

Kansas City, Missouri

Trends & Forecasts

production through better cultivation, is putting up 5 new mills.

All this activity likely will again put sugar in a more normal surplus position, with consequent calming of the world price situation.

With the world sugar price premium for 1957 delivery recently running more than $1 per 100 lb. compared to that for 1958 delivery, the stage is set for exporting large quantities of the harvest this fall, according to B. W. Dyer & Co., sugar economists. Well over 1 million metric tons of sugar could be borrowed from 1958 consumption.

Poultry Feathers Ruffled

More pounds of high-quality edible meat protein are being produced more quickly with poultry than with any other meat animal and at less cost in feed and labor. Yet this achievement may not be enough to get the fast-growing poultry business over its economic bumps.

Expanding at the rate of 10% per year, this field faces the disheartening probability that it will require more capital than can be self-generated.

Another problem is a shortage of capable executives. And still a third is rough price competition, abetted by some big retailers who like to attract consumers to their stores with bargains in chicken. This poses a particular problem for processors who aim at top quality, especially those who add about ¼¢ a pound to their costs by treatment of fresh birds with quality-protecting antibiotic.

It looks to many in the field as if the situation calls for "vertical" mergers to cut costs, improve profit margins, supply more capital, strengthen management, and eliminate the vulnerability inherent in being but one link in the poultry producing and processing chain.

It is predicted that by 1960 the industry will consist of a number of recently integrated operations furnishing consumers with poultry meat that these businesses have "manufactured from grain."

In its fight for more profitable business, the field has endeavored to build markets abroad. It formed an International Trade Development Committee, which signed an agreement with the Foreign Agricultural Service of USDA to provide a million dollars to conduct market development in Europe and South America. But so far, only West Germany has "signed up" for poultry imports under Public

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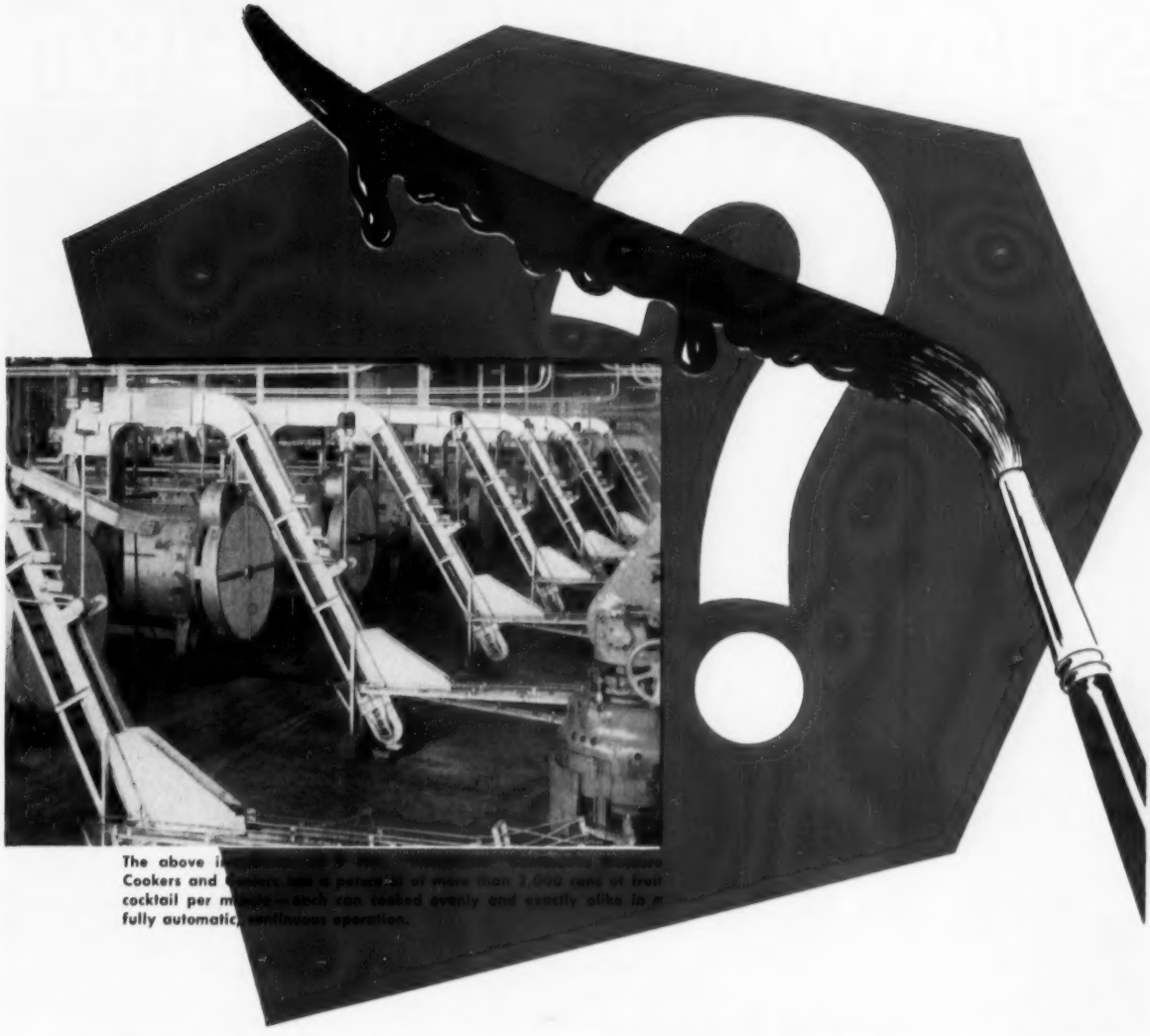

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Law 480. This deal involved $1,200,000 worth of chickens, turkeys, and ducks during 1956, and 3,406,500 lb. of fowl were shipped.

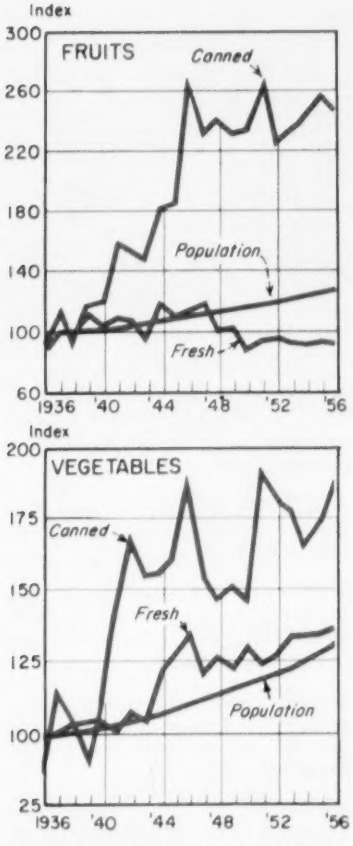
Canada, however, still is the best export market for poultry, while Cuba, Mexico and Venezuela are the leading importers of U. S. eggs.

Prineipal cities abroad have enough "carriage trade" and tourist business to afford the quality and convenience of American poultry, if only this market can be further developed.

Food Imports Drop 6%

Imports of food and other agricultural items totaled $2,189,000,000 from July, 1956, through January. This was a decline of 6% from the comparable 7-month period of a year earlier.

Pork and olives in brine have



PRETTY PICTURE is presented by the production curves for canned fruits (top) and vegetables in past 20 years. Comparison with curves for fresh products and population shows how rapid our trend is to a nation of processed food consumers.

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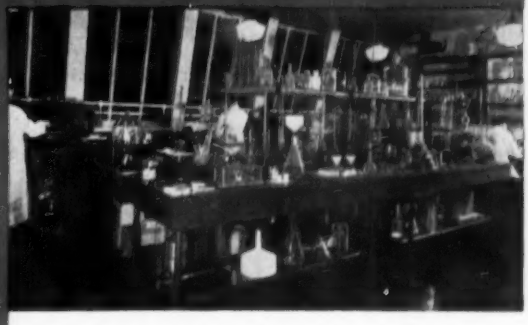

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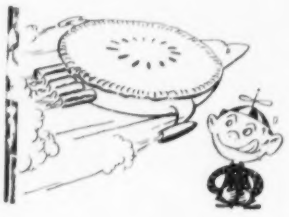
Trends & Forecasts

been running behind the previous year for several months. Coffee imports rose again in February, but the July-February total of 1.9 billion lb. is 48 million lb. less than a year ago.

For the months since last July, cocoa bean imports are off 9%. But it is likely that the recent lag will be made up during the next few months by increased shipments.

HORS D'OEUVRES

▶ General Mills is to be commended for distributing recipe records for use by the blind. And perhaps label instructions should be die-pressed as a paper recording into a side panel of every package. Few people who see can read directions.



▶ Panagra flights to South America serve special meals to youngsters and offer adults a choice of 26 inter-American dishes. The pie in the sky was never so tempting.

▶ Meteorologists are at the top of the pay scale for scientists. Never dreamed that it could pay so well to be wrong so often.

▶ Turkey has been made into sausages experimentally. Fine thing to do with the king of feasts.

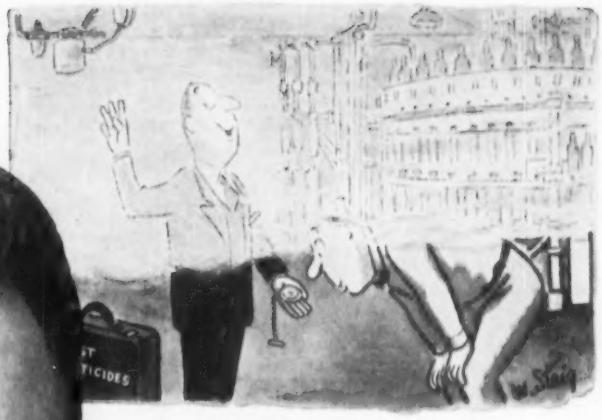
▶ An alleged top-drawer Commie spy was a foreman in one of our spice companies. That should season your care in screening employees.

▶ A new mobile cafeteria slides out of a truck body and is ready to serve it up hot. Just one step from house-to-house beaneries.

▶ Sales of one cat food jumped 85% last year. Looks like too many people have beaten a path to the door of the man with the better mousetrap.

▶ Patent application is in for chocolate-colored paper cups impregnated with chocolate flavor. These are intended for chocolate drinks. But why not just eat the containers?

← For more data, circle this page number on card at back



William D. Wagner
SERVICE SUPERINTENDENT
Bowman Biscuit Company
Denver, Colorado

"See! Only 30 seconds to fog this room!"

THAT's how quickly you can control insects in 10,000 cubic feet of space with WEST ATOMIZERS and potent, penetrating VAPOSECTOR insecticide.

Insects have no place to hide. VAPOSECTOR penetrates everywhere:

— cracks and crevices
— even remote hiding places.

Insects have no time to escape. VAPOSECTOR penetrates their outer skin for a quick, permanent kill. Yet it's safe to use. Odorless and nontoxic when used as directed.

INSECT control is economical — when VAPOSECTOR is used in a WEST ATOMIZER. Only one or two ounces control all insects in 1,000 cubic feet of space. In just 3 seconds. At a cost as low as 5¢.

"We know of no safer insecticide than Vaposector"

"Quality and uniform consistency is what we sell — and also what we buy when it comes to proper insect control in our plants. We have found that West's Vaposector insecticide is the most effective, economical, and above all, the safest insecticide available to us," says MR. WILLIAM D. WAGNER, Service Superintendent of Bowman Biscuit Company, Denver, Colorado.

"West's trained specialists have helped us install a control program which has proven simple to enforce, economical to operate, and has provided us with greater protection than we've ever before enjoyed. Our program has enabled us to maintain the highest quality standards at lowest possible costs."

Would a similar program interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send your 32 page booklet, "Industrial Insect Control."
☐ Please have a West representative telephone for an appointment.

Name .....

Position .....

Mail this coupon with your letterhead to Dept. 122

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Report No. 1 of a series

I used to freeze solid until I found

← For more data, circle this page number on card at back

Kathabar® systems deliver air continuously

at dry bulbs and dew points down to minus 90 F

You know how much money you could save your company if you could get a continuous supply of air at conditions anywhere below 32 F dry bulb and dew point. You also know how free you could be if you didn't have to worry about frost, coolant temperature, and any other obstacles to low-temperature operation.

These profits are immediately available to you in a Kathabar-engineered air conditioning system. Specify any sub-freezing air conditions you require, and Kathabar engineers will meet your specs with a system which is economical, continuous, automatic, and simple.

sample conditions

The conditions you want may be in this group of Kathabar-engineered installations:

PROCESS	AIR OFF KATHABAR	
	dry bulb	*dew point*
Ordnance testing	-90 F	-100 F
Wind tunnel	-47 F	-61 F
Candy bar chilling	0 F	-19 F
Photo film chilling	6.5 F	2 F
Glass laminating	23 F	-2 F
Brewing	28 F	10 F
Chemical processing	24 F	5 F

These samples merely hint at the versatility of Kathabar systems. They will give you dew points as low as minus 90 F under pressure or vacuum, if you want them.

pay-off points

To you, the possibility of a continuous process at sub-freezing air temperatures might be the greatest advantage of a Kathabar system. To someone else, its precise control of dry bulb and dew point is the chief attraction. Others say they gain most from Kathabar engineers' knowledge of materials and processes.

All Kathabar low-temperature applications have clear advantages in common. They tremendously increase cooling efficiency by eliminating frost. This prevents refrigeration freeze-ups, avoids cyclic operation, and often gives better cooling with less tonnage.

They eliminate defrosting shutdowns and the need for duplicate coils.

With "Kathene" solution, the most potent chemical absorbent known, a 10 F to 25 F dew point depression may be obtained between the outlet air dew point and the cooling medium temperature. There is no need to cool the air or the absorbent to the desired dew point temperature. There is exact control of dew points without vaporization or "carryover." Regeneration of the absorbent is automatic and continuous.

Operation and maintenance are simple and economical. In many cases, Kathabar systems can be adapted to existing air conditioning systems.

who uses Kathabar systems

Kathabar systems make profits out of air for these industries:

Atomic Energy	Machining
Breweries	Marine
Cake Mix	Matches
Candy	Meat
Cellophane	Offices
Cellulose	Ordnance
Cereals	Paper
Chemicals	Pharmaceuticals
Coffee	Plastics
Comfort	Printing
Compressors	Rockets
Cookies	Rubber
Electronics	Sanitaryware
Explosives	Shellac
Film	Sugar
Foundries	Testing
Gelatin	Textiles
Glass	Transformers
Glue	Transistors
Gum	Vacuum Tubes
Hospitals	Varnish
Hotels	Waterworks
Lacquer	Wire
Lenses	Yeast

how they use Kathabar systems

Many of these industries use Kathabar systems for obtaining continuous air at sub-freezing dry bulbs and dew points. Others use them to (1) maintain spaces below 80 F and 55% RH; (2) deliver sterile air at specified dry bulb and dew point; (3) eliminate wet floors, walls, equipment; and (4) improve drying processes.

Write for additional information; you'll get it by return mail.

Air Conditioning and Drying Division
SURFACE COMBUSTION CORPORATION
2382 Dorr Street Toledo 1, Ohio

Kathabar systems by Surface

For more data, circle this page number on card at back →

Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most – right on the inside surface. If you try to get rid of the bulge – at fair cost – the metal is undercut – and corrosion and erosion start there.

why there's NO BEAD–NO UNDERCUT

But Trent put a stop to that – simply by going into partnership with gravity. With their exclusive Contour-Welding process, they weld at the bottom – and gravity works for them. For then, the bulge is in the opposite direction – blending in perfectly with the contour of the pipe itself.

. . . *with new* CONTOUR TRENTWELD

New Contour-Trentweld stainless pipe and tubing is so smooth, both inside and out, that you can't even feel the weld. It's stronger, more uniform, with no place for corrosion or erosion to get a toe-hold. And it's available in any size or gage . . . in all stainless, high-alloy, Hastelloy and titanium grades that can be welded.

CONTOUR TRENTWELD **Stainless and High Alloy Welded Tubing**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of Crucible Steel Company of America)

DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Army's new food radiation center, near Stockton, Calif., will have a 24-million electron-volt linear-accelerator that will penetrate 6 in. of packaged food with ionizing radiation. The machine will be the highest average-power accelerator ever built.

To make food irradiation commercially feasible—and with FDA approval— seems to be a Quartermaster goal. Our armed forces will need ready sources of imperishable perishables in event of a fast-moving atomic war.

With a new flexible-worm conveyor system suspended from the ceiling, as much material-in-motion can be accommodated in cooling, hardening, defrosting, or drying rooms as can be stacked in them. Inverted U-hooks ride on worms and carry racks or baskets of packaged food.

Dizzy-paced packaging progress brings you these: Heat-shrinkable Mylar; transparent bubble packs; injection-molded ice cream containers; transparent banding for multipacks; fog-proof cellophane; coated Mylar for vacuum packaging; film with antioxidant in coating; and transparent corrugated material.

Aluminum foil liner and overwrap are wax-bonded to carton to form a semi-rigid "can." A new perforated-foil package permits cooking macaroni in water, and draining. Then there are cheese grater, double-boiler, frosting-gun, and flour-shaker convenience packages made with foil.

Immersion freezing, which fits nicely into continuous operations and effects fast heat-transfer, is arousing wide interest in the poultry field. Better color is reported for turkeys.

Pushbutton cleaning of pipes and pasteurizer in place, with great labor saving, has been introduced by Borden. Chlorine-alkali solution, 100-deg. water, and hot acid cleaner are alternately cycled through system.

Coliform tests for milk are easily made with Bacto-Strip. Sterile paper containing culture media and dye absorbs 1 ml. of milk. After incubation of strip for 10 hours, red "coliform" dots develop.

To control thickness and density in continuous processing, a new instrument has been borrowed from the cigarette industry. Using penetrating radiation, this unit measures and controls dough-sheet thickness. And it is experimentally measuring ice cream overrun.

One man now can put a semi-trailer onto a piggyback flatcar in 4 min. As tractor backs trailer against side of car, trailer slides off its wheel assembly onto a hydraulic lift on car. Then lift turns and lowers trailer.

Portion-controlled cream package, formed from polyethylene-cellophane laminate, combines top convenience with high product protection.

Unique Pouch Broadens

• Film laminate triples sales life

"IT'S THE GREATEST advance in packaging of dairy products since the invention of the waxed carton." These words by Dick Whitehill, president of Cheslam Corp., signal this company's final development of a radically new single-portion cream package that is now being commercially tested by Ira Wilson & Sons Dairy in Detroit.

His enthusiasm may be right on the mark. For this film-pouch container can now be formed at a very low cost on high-speed equipment that is specially constructed to meet the rigorous standards of the dairy field.

It offers the consumer—both home and institutional—a clean, convenient package that more than triples storage life of cream under normal refrigeration.

Furthermore, with this unit the dairy gains complete control over sanitation in the final packaging operation, and has a superlative opportunity to carry its brand name directly to the institutional consumer.

Laminate Offers Strong Shield

The film used to form the pouch is Cellothene—composed of No. 300 moisture-proof cellophane (MSAT 80, duPont; and MSBO, American Viscose), coated with a 2-mil, hot-melt extrusion of polyethylene (high molecular weight).

This combination forms a barrier to moisture vapor and gas. Employing a very small headspace and normal refrigerating temperatures, it has kept cream for over 30 days.

The cellophane is reverse-printed by a flexographic process (in white and lavender for the Ira Wilson package), and the inks are sealed from product by the polyethylene.

Pour Spout Formed in Seal

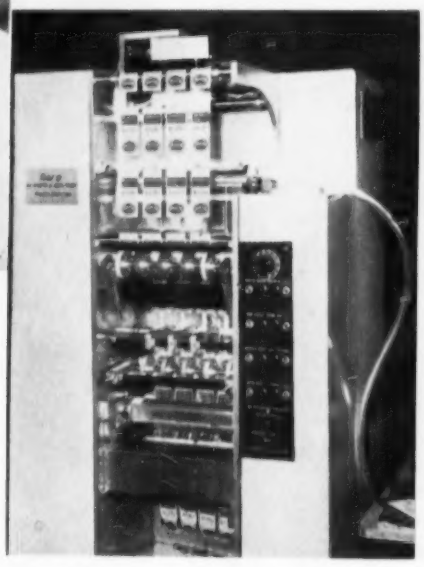
Real secret of the container, however, lies in the patented pouring spout. This device is a channel formed by the heat sealing dies in the top seal. Perforations in this area permit consumer to rip off the outer section of the seal, exposing the pouring spout (see photo, left).

In the cream package, this dispenser is a straight channel, tilted at 45 deg. for easy pouring. Product will flow through the channel only when pressure is applied to the pouch. And the package will not leak when placed on a table, even though the spout is opened and exposed.

A zig-zag spout has also been designed to prevent inadvertent leakage with more difficult food products, such as salad oils.

For convenient handling, supplementary containers has been devised by Cheslam to hold the pouches. Constructed from waxed paper in three sizes, they carry the equivalent of a quart, pint, and half-pint of cream, respectively. The quart unit

Non-drip pouring spout is opened by removing perforated tear-strip. This channel can be centered, offset, or formed in a zig-zag shape to suit the peculiarities of different products.



Stainless steel filler forms four strips of packages, simultaneously, at a very low cost. Pouches are made upside down, filled and sealed without scorching food.

Single-Service Market

- Ingenious pouring spout eliminates drip
- 200/min. output achieved by new packager

has an easily opened dispensing slot in the bottom.

Packager Key to Success

The new machine that forms and fills this pouch is equal in importance to the package itself.

Turning out over 200 containers a minute, the high-speed unit, says the manufacturer, carries U. S. Health Department approval, and incorporates stainless steel in strict accordance with 3A sanitary standards. The maker is Wee-Pak Machine Corp., Anaheim, Calif., which claims that the working parts of the packager can be dismantled for cleaning and reassembled in 10-15 min.

Chief advantage of this machine is its extreme versatility. It will fill from ¼ to 4 oz. of liquid through 1 to 4 nozzles at a single stroke, and will handle liquids having consistencies that range from that of water to butter. Either a hopper feed or direct connection with the process line can be used. And each nozzle can be connected to a separate hopper or filling line for flexibility in packing a multi-product line.

The unit uses two film webs that can range in width from 7 to 18 in. Each of these webs is slit on the machine into widths from 1¾ to 4¼ in.

However, to use all four nozzles, package width must be restricted to 2 in. Above this figure, the machine operates on only two nozzles.

On a 2-in. web, the packager will fill a pouch 15-in. long. Lengths up to 30 in. can be handled at smaller widths. This versatility is possible because the filling pump can be set to deliver more than one stroke per package.

In action, film strips are drawn around the filling nozzle, where side seals are formed by the rotary sealer. At the same time, this die applies an extra-wide seal, containing the pouring spout, which serves as the top seal for one package and the bottom seal for the pouch above it. An electric eye governs registry.

As the seals are formed, the filling pump delivers an extremely accurate charge into the film "tube"—then sucks back a few drops, an action which prevents product from remaining in contact with the area of the film to be heat sealed.

As a further guard against scorching the product, the heat sealers operate on a fast cycle, with only minimum temperature and dwell-time needed for tight closure.

Last packaging step is by a cutter that clips pouches apart.

At Ira Wilson, the packager is set to fill a 1¾x4½-in. pouch with ¾ oz. of cream. According to the converter, price of the packaging material—including waste and printing charges—is $1.32 per lb.

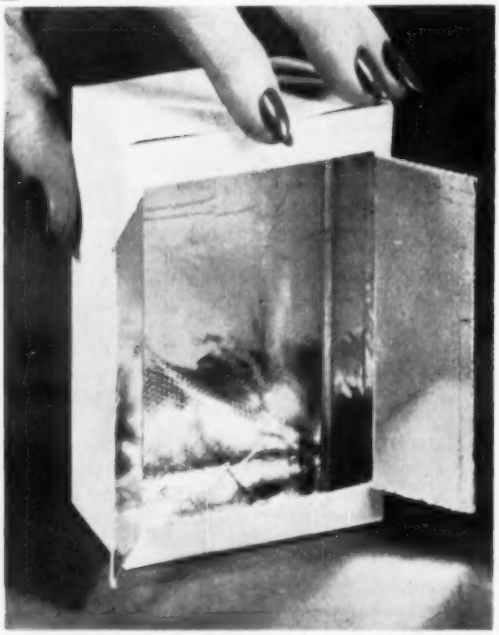
Calculating wage and transportation figures at New York rates, total cost of the cream pouch, therefore, runs about 0.25c. per unit.

NEW PACKAGES & PRODUCTS

FLOUR SHAKER package design by Aluminum Co. of America has been adapted by Pillsbury Mills. Shaker-top of foil-laminated spiral-wound can allows sifting while pouring. (20B)

BUILT-IN GRATER is feature of cheese package idea offered to food men by Aluminum Co. of America. On table are a cake mix package, double boiler, frosting gun, cook-in bag for macaroni and cheese, and a pastry gun for cream cheese mix. (20A)

COMBINATION of flexible and rigid packaging is this 3-part Clo-Can produced by Reynolds Metals Co. It consists of carton, aluminum foil liner, and foil overwrap bonded together with micro-crystalline wax. (20C)



26th Packaging Show Draws 35,800 to View Newest Materials, Methods

PRODUCT VISIBILITY is the trend mirrored in this oriented polystyrene fish stick container displayed by Plax Corp., Hartford. Made of Polyflex 100, the package withstands temperatures up to 150F. as well as freezing. Heat-sealed lid may be printed or embossed. (20D)

Circle Key Numbers on Reader Service Card

a clean drain...the easy way...

DRAIN-AID, NEW BACTERIA-ENZYME DRAIN CLEANER, IS PROTECTED BY A SPECIAL RIEGEL POUCHPAK* . . . POUCH PAPER LAMINATED TO FOIL, THEN POLY-COATED AND PRINTED. PACKAGED AT HIGH SPEED ON TRANSWRAP. *TM

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

Riegel PROTECTIVE PAPERS FOR PACKAGING

GLASSINES AND GREASEPROOFS
Plain • Waxed • Printed
Lacquer-Coated • Laminated

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BOOST PRODUCTION

"Fudgsicle" processor prevents foam, minimizes rejects with Antifoam AF Emulsion.

stop waste with a Silicone Defoamer

YOU KILL FOAM FAST, increase productivity, stop wasteful and unsanitary boil-overs or spillage when you use a Dow Corning Silicone Defoamer. Physiologically harmless, water dilutable Antifoam AF Emulsion may be used in processing nonstandardized foods at concentrations up to 34 ppm; Antifoam A Compound up to 10 ppm.

Effective in remarkably low concentrations, Dow Corning Silicone Defoamers are the most versatile and economical foam killers ever developed for food processors.

For example—

In Chocolate Syrup
1 oz Antifoam AF per 2075 lb.

In Dill Pickling Solution
1 oz Antifoam AF per 15,625 lb.

In Vitamin B2
1 oz Antifoam A per 35,000 lb.

In Chewing Gum Base
1 oz Antifoam A per 20,833 lb.

Free Sample *—make your own test — send coupon today*

DOW CORNING SILICONES

Dow Corning Corporation
Midland, Mich., Dept. 5517

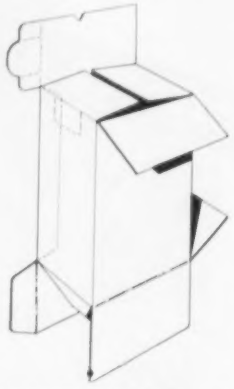
Please send me:
FREE sample of ☐ Antifoam A Compound ☐ Antifoam A or ☐ AF Emulsion.
☐ Booklet on Silicone Defoamers.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

Packages & Products

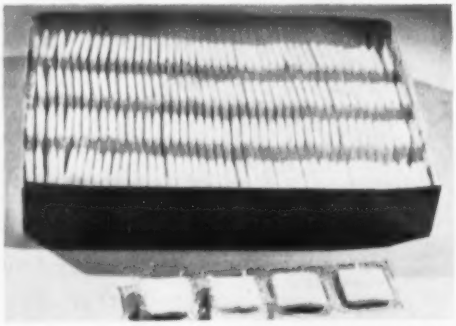
CORRUGATED CELLOPHANE under test by Lassiter Corp. offers tough cushion protection and eliminates need for backing. (22A)

FOOD APPLICATIONS were displayed for: Blister pack, heat-sealed acetate bubble by Packaging Industries Ltd., Inc. (22B) Tamper-proof skin package by Acepak Inc. (22C)



SIFT-PROOF CARTON for dry foods has overlapping flaps to eliminate in or outside wraps. It is supplied by Lord Baltimore Press. (22D)

PERFORATED FOIL bag holds macaroni and cheese dinner. The bag is dipped in boiling water to prepare, allows water to drain when removed from pot. Idea was exhibited by Alcoa. (22E)

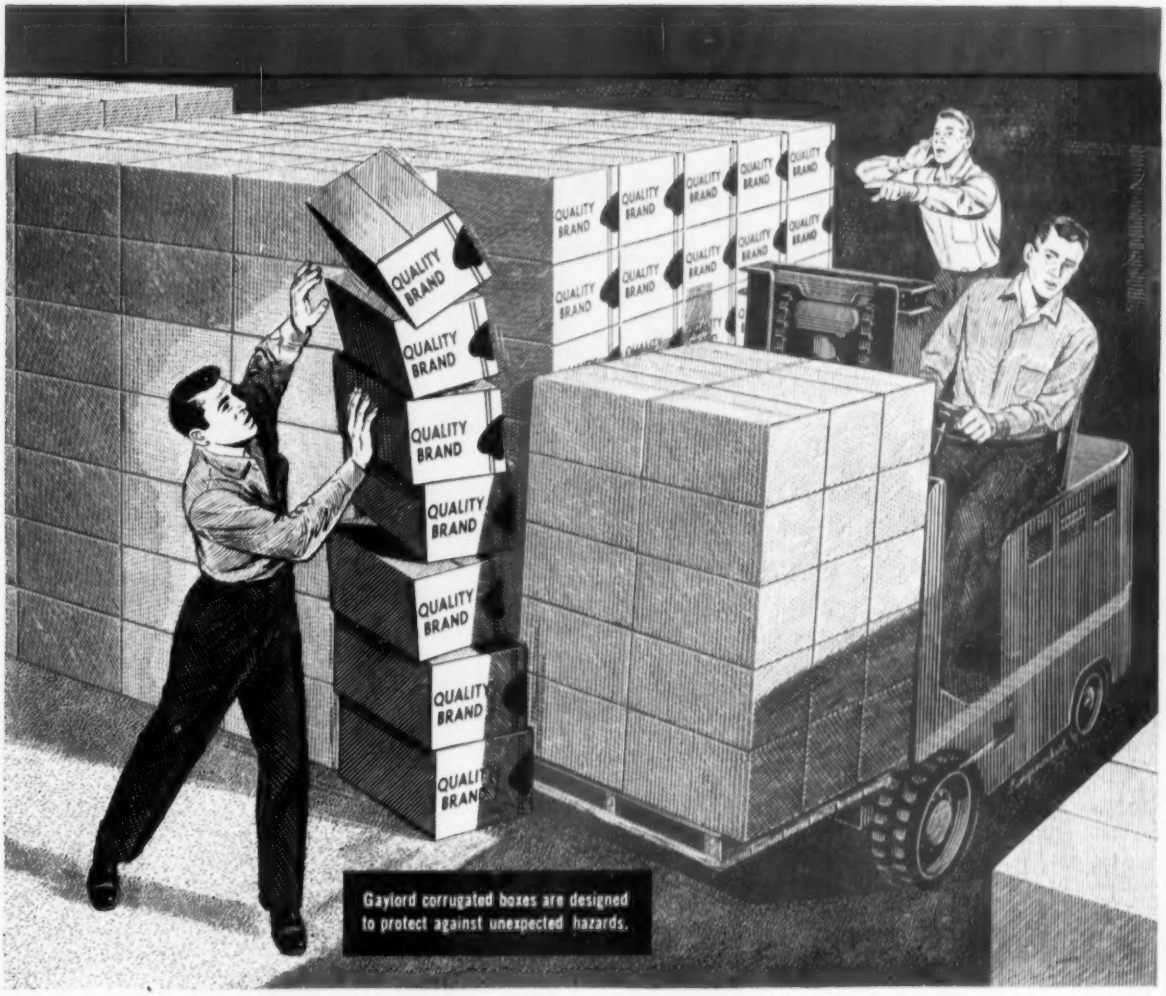


INDIVIDUALLY WRAPPED butter patties for institutional use were developed by Butter Wrap Corp. using Avisco cellophane. Accurate machine slicing and wrapping saves labor, money. (22F)

ONE-PORTION SERVINGS of jelly are packaged in cups using FDA-approved acetate film. Manufacturer is Prime Pack, Los Angeles. (22G)

Show Marks Debut of These New Films

- **Special coatings** for Du Pont's Mylar polyester film mean increased permeability, heat-sealing advantages.
- **Experimental film,** Dow Chemical Co.'s Styron 60, is cheaper than cellophane, must be sealed with solvent at present.
- **Polymer-coated film,** called K-203 cellophane, resists moisture fogging or clouding on frozen food. Made by Du Pont, film is grease and gas resistant.



WHEN YOUR PRODUCT NEEDS A FRIEND

Gaylord Boxes

When your product leaves your plant and starts through the cold world of distribution, its best friend is the box that carries it.

Gaylord boxes have a proven record of carrying products to their destination "safe and sound"—whether they're big and bulky, tiny, square-shaped, pear-shaped, heavy, light, rigid or resilient.

Call your nearby Gaylord packaging engineer.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

Ask Standard

how to cut costs with conveyors

Although over 19,000 items are stocked, conveyors permit fast and efficient assembly, checking and packing — orders ride safely in durable, lightweight tote boxes.

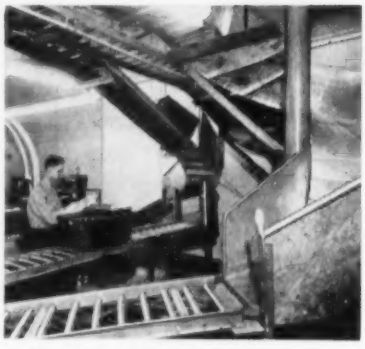
Milwaukee wholesale drug firm

ups order-filling 50% with 3-floor conveyor system

WITH conveyors, The F. Dohmen Company, Milwaukee, Wisconsin, designed a system which has permitted them to fill upwards of 50% more orders per day . . . reduce to a minimum, excessive overtime costs . . . reduce errors, delays and merchandise damage. Standard belt and roller conveyors connect every department in the firm's three-story warehouse.

This installation is typical of what Standard can do to solve material handling problems. Standard designs and builds permanent and portable systems and units, using roller, belt, slat, chain, pushbar or sectional conveyors — power or gravity; also spiral chutes and pneumatic tube systems.

For complete facts, consult STANDARD CONVEYOR COMPANY, General Office: North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Floor-to-floor route of conveyor system assures minimum wasted motion by employees. Above, "close-out" checker makes final inspection of orders.

For details on Standard Conveyors of all types, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin D-5.

Packages & Products

Produces Aluminum Can

Aluminum Limited has announced full-scale production of a seamless, rigid aluminum can at its German subsidiary, Aluminiumwerke Goettingen.

Reported as the first completely automatic aluminum can line, manufacture is based on the impact-extrusion process. In this method, slugs are fed to a die in a press and struck with a punch, causing the malleable aluminum to "squirt" out over the punch and form a seamless can body.

Circle 24A on Reader Service Card

Concentrate in Smaller Cans

Reported by the processor as the first of its kind, a 10-oz. frozen orange juice concentrate can has been added to Topco Associate's line.

The new size replaces the 12-oz. can and supplements 6-oz. size.

Frozen Food Packers Meet

Members of the Eastern Frosted Foods Assn., met in New York City last month for the organizations annual Prepared Frozen Food Day. Included in the products displayed were:

- Quick-frozen garlic bread marketed by Petite Foods Corp.
- Southern-style corn fritters packed five to a foil-wrapped carton, made by Milady Food Products Co.
- Jumbo cheese ravioli processed by Diamond Ravioli Co.
- Heat and serve shrimp rolls packed complete with mustard by Temple's Frosted Foods.
- Buttered fish steaks (cod) pre-

for less than 1/20th of a

SOFT SEAL makes cases easy to open

SOFT SEAL is the simple way to make shipping cases easy-to-open. No gimmicks. No new equipment. No extra labor. Why? Because SOFT SEAL simply replaces adhesives that seal with a hard-to-open tearing bond.

SOFT SEAL allows top-flaps to be lifted without tearing, tugging, straining. Protects goods from damage by eliminating case-slashing in stores and supermarkets. Saves time. Builds goodwill.

. . . all at a cost difference of less than 1/20¢ a case!

SOFT SEAL safely keeps flaps from popping open during shipping and handling. As proved over and over again during ten years of commercial use. We'd like to demonstrate the special adhesive properties of SOFT SEAL in your own plant. Just write or call your nearest National office.

RESYNS® National ADHESIVES

NATIONAL STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

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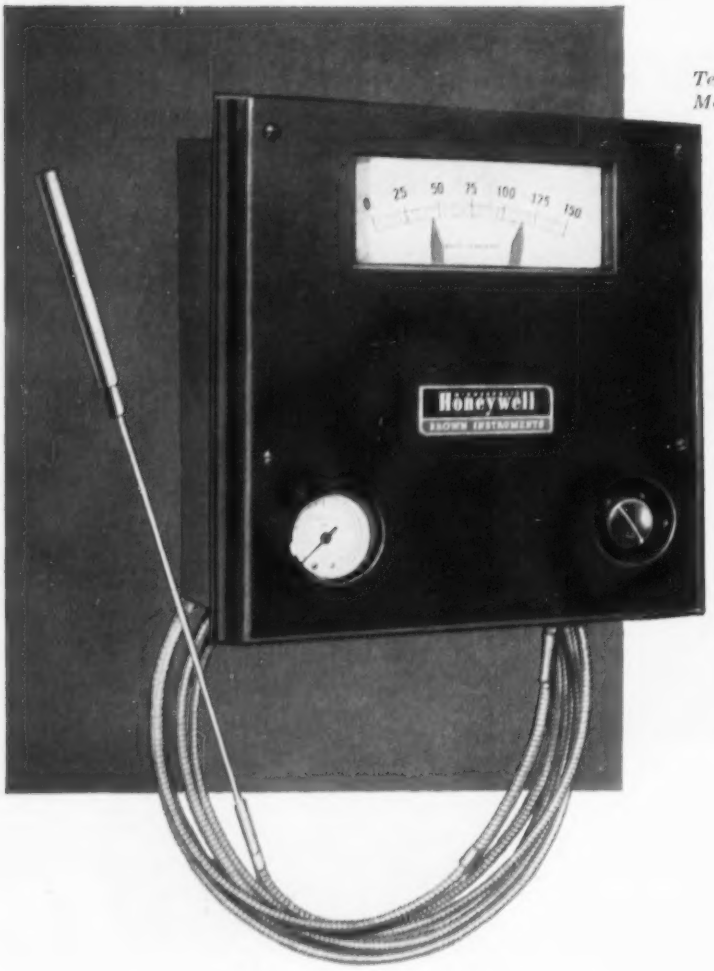

Temperature Controller
Model 604P5

HONEYWELL TEMPERATURE CONTROLLER

simply designed, moderately priced

Here's a simplified temperature controller that may be exactly what you need for automatic control . . . at moderate cost.

This indicating pneumatic temperature controller uses many of the same high-quality components usually found only in larger, more expensive instruments. Design simplification—not corner-cutting—makes possible its reasonable price.

The controller requires less than one square foot of panel space. It has just one control knob and two air connections . . . is extremely simple to operate. Available in temperature ranges from −40 to 1000 F. Pneumatic on-off or 10% *Throttlor* control.

Your nearby Honeywell sales engineer can help you profitably apply this and other Brown Instruments. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa. —in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:** Write for Catalog C $\frac{600}{700}$1.

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS
First in Controls

← For more data, circle this page number on card at back

heated in hot butter by Mrs. Paul's Kitchens.

- Sliced calves liver—three servings to a carton—exhibited by Excelsior Quick Frosted Meat Products.
- Fruit salad, frozen in a creamy, naturally fruit-flavored base, and called Frozen Fruit Delight, displayed by Stouffer Corp.

Bands Jars, Premium

Developed by Tee-Pak's newly formed Cellulose Packaging Division is a cellulose band for forming multipacks. Providing a clear view of jar or can label, the transparent film may also be used to band a premium to the containers.

Circle 27A on Reader Service Card

Family Size Boneless Ham

Wilson & Co. has introduced a new boneless and skinless ham, with a minimum of fat waste, to limited markets. Called Tender Made Slice 'N' Serve, the new ham is the result of a year of intensive research and planning.

Geared to the trend in convenience foods, the ham is prepared by heating and supplies just enough meat for one average family meal, eliminating the problem of leftovers. Packaged in cylindrical vacuum packages sealed in transparent film, product ranges in size from 2-4 lb.

Instant Oyster Stew Soup

Recently introduced in Chicago was Mavar Shrimp & Oyster Co.'s condensed instant oyster stew soup. The canned product is mixed with milk and heated to prepare. It is made with whole and chopped cove oysters.

Continuous, Trouble-Free Operation for...

DRY DUST CONTROL

If you're airing a dust control problem for industrial process or community relations . . . consider the factual benefits of field-proven Ducon Cyclones for dry collection. Hundreds of leading plants throughout the world, handling a wide variety of products, have found that Ducon dry-type collectors provide the continuous operation needed to capture nuisance dusts and recover usable product . . . most effectively, and with no processing down-time for sludge clearance. Consult a Ducon field engineer who may have a ready answer for your specific dust control problem.

Write today for descriptive Bulletin No. DC-49

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THE **Ducon** COMPANY INC.

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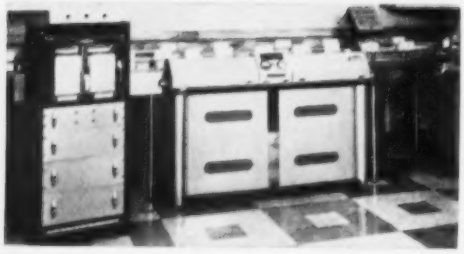

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controls package weights . . .

protects your profit margin

Selectrol takes the guesswork out of package weighing —eliminates the need for deliberate over-fill to assure full weight—increases your profits by preventing product waste. Weighs every package automatically.

This high-speed checkweigher fits into any production line, weighs in motion without interrupting production flow. Out-of-tolerance units are smoothly diverted to their respective over and under weight channels. Correct weights move on without further handling. Constant checkweighing, in contrast to spot checking, permits better control of filling operation, increases the percentage of correct weights, reduces handling costs.

Selectrols are backed by more than 40 years of experience in the manufacture of precision industrial scales. Write for complete information.

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Packages & Products

Dairy's Cream Pies Debut

Frozen cream pies are now processed by Carnation Co.'s Los Angeles Frozen Food Division. Made in three flavors, chocolate, lemon, and coconut, the pies are marketed under the Simple Simon label.

The 1 lb. pies are ready to eat after 45 min. of defrosting. Package is a carton overwrapped with waxed paper.

The processor will soon add a fourth flavor, strawberry, to the line.

A B C's for Breakfast

General Foods' new sugar-coated oat and corn cereal takes a page out of the soup processors book—the breakfast food is molded into the letters of the alphabet.

Called Alpha-Bits, the product has been introduced in selected test markets by the Post division.

New Products Shorts

Low-Calorie Marshmallows is newest Dia-Mel product for the diet-conscious consumer.

Pineapple-Acerola juice blend developed by BiB Corp., Lakeland, Fla., offers baby a non-citrus source of Vitamin C.

Instant Dessert Topping called Dream Whip from General Foods has double advantage of convenience and reduced calories.

New Quick Fudge Mix has been added to Junket line. Three flavors are processed: chocolate, penuche, and coconut.

Extra-Sharp Cheddar has been added to Armour & Co.'s Miss Wisconsin line.

Pizza Pie Mix has been introduced by Prince Macaroni Co., Boston and New York City.

Frozen Mexican Dinners are now marketed by La Cabana, Riverside, Calif.

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IF THE FLAVOR'S RIGHT, family appreciation will be the housewife's happy reward for having used *your* brand of ready-to-bake cake mix or other easy-to-use food preparation. Your reward, of course, will be another loyal patron for your goods. Such winning taste effects are not casually achieved. Indeed, they are most frequently the result of intensive laboratory experimentation and study by specialists—by *flavor specialists* like those of whom our own Flavor Division can proudly boast. Remember: *Your product is* ONLY *as good as its* FLAVOR!

If you have some very special flavor problem to contend with, our Flavor Division will gladly help you

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Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* °STOCKS: *Atlanta, Georgia, Boston, Massachusetts, °Chicago, Illinois, Cincinnati, Ohio, °Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, St. Louis, Missouri, Montreal and °Toronto, Canada and °Mexico, D. F.* FACTORY: *Clifton, N. J.*

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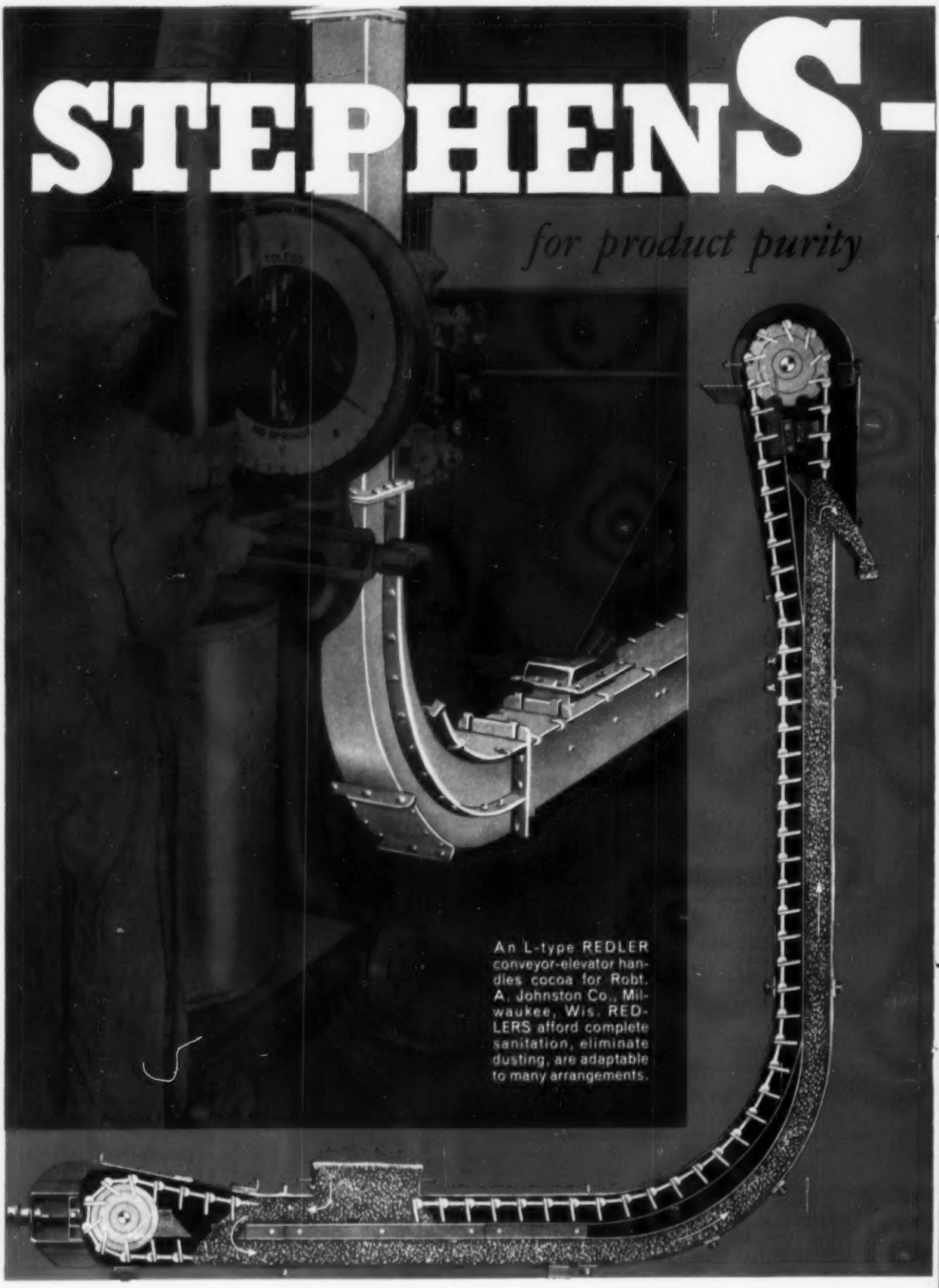
STEPHENS-

for product purity



An L-type REDLER conveyor-elevator handles cocoa for Robt. A. Johnston Co., Milwaukee, Wis. REDLERS afford complete sanitation, eliminate dusting, are adaptable to many arrangements.

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-ADAMSON

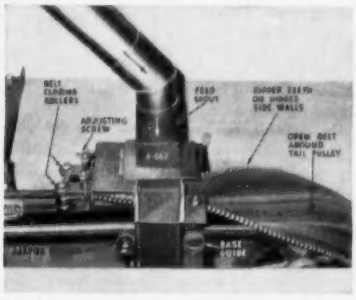
and protection in bulk food conveying systems

Are your bulk food products being handled by improper methods or by a soundly designed, cost saving mechanized conveying system? Unless the answer is yes, your material handling bills are running too high.

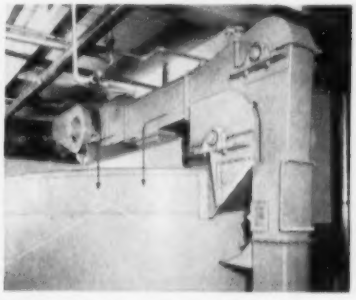
We know that STEPHENS-ADAMSON engineered conveying systems can knock down these high costs because they're designed to work the clock round if need be. They will move your bulk materials in a way that will turn production costs into profit dollars.

S-A handling systems do the jobs assigned them so well because they are put together by some of the best engineering brains in the bulk material handling industry. These men draw from a wide line of S-A manufactured equipment in their planning.

Be sure your food handling methods are all they should be. If you suspect they are not, consult with a STEPHENS-ADAMSON engineer. There's one in your area.



The Zipper type conveyor-elevator moves bulk materials to storage and reclaims gently, without spillage or contamination. It completely encloses the product, moves in any plane. The belt automatically opens and closes.



At Olympia Brewing Co., Olympia, Wash., a Z-type REDLER elevator-conveyor handles ground malt. REDLER units, available in many arrangements, are ideal for food product conveying due to their completely enclosed construction.

An S-A belt conveyor system carries soybeans from hopper to dryer building and back to main storage for the Drackett Co., Cincinnati, Ohio. The overall system also includes both bucket and REDLER type elevators.

S-A manufactures a wide range of material handling products in three complete plants in U. S. and Canada.

Belt Conveyors
Belt, Pan & Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage & Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
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Centrifugal Pilers
Bin Gates & Tunnel Gates
Car Pullers & Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

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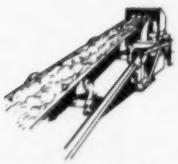
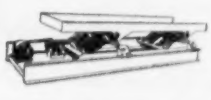
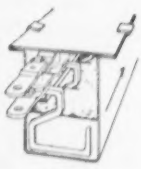
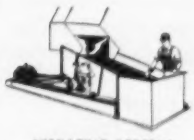
DESIGNERS • ENGINEERS • FABRICATORS


BELT CONVEYORS


VIBRATING CONVEYORS


REDLER CONVEYORS, ELEVATORS

ZIPPER CONVEYOR-ELEVATORS


VIBRATING SCREENS

BUCKET ELEVATORS

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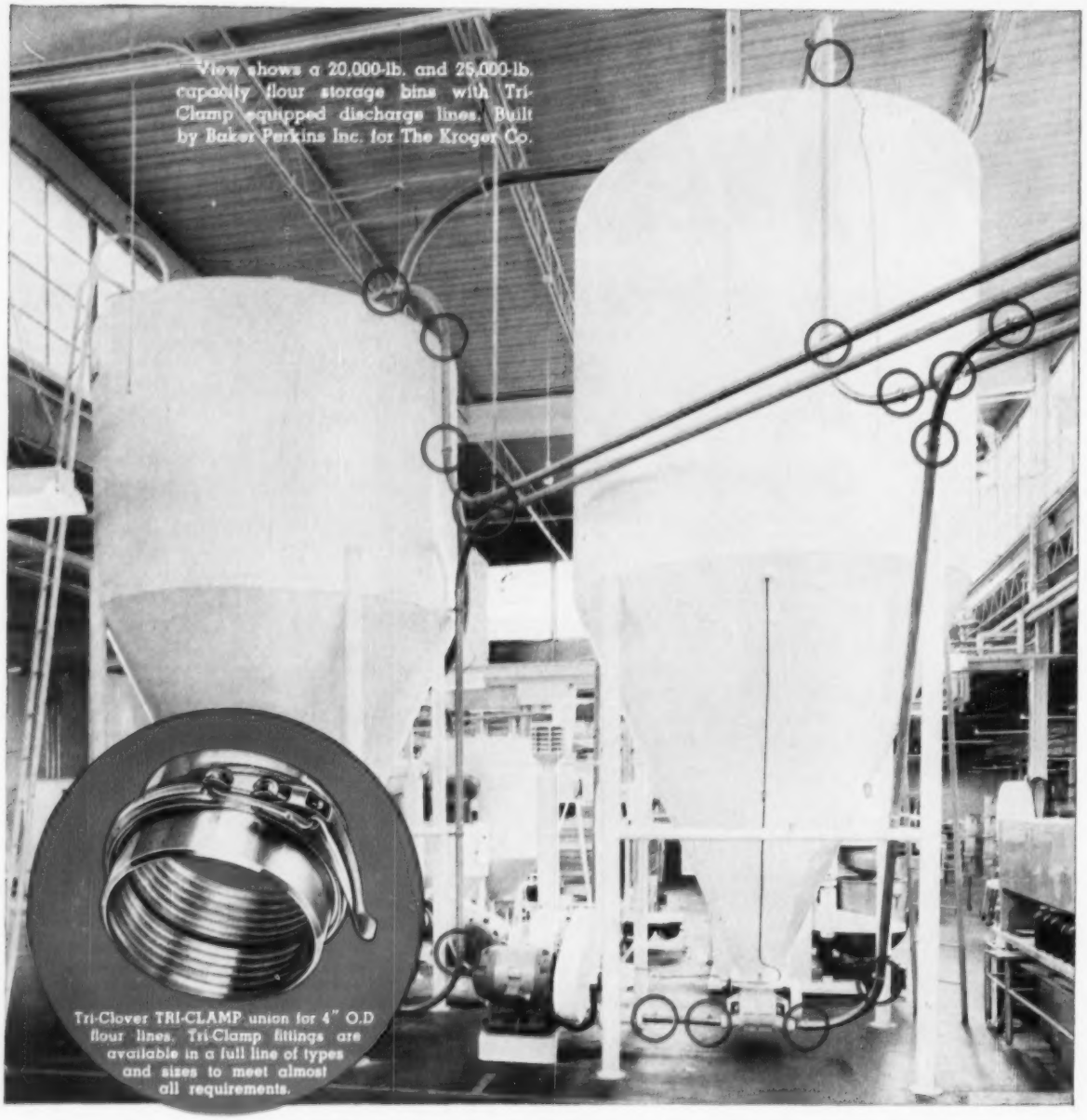

View shows a 20,000-lb. and 25,000-lb. capacity flour storage bins with Tri-Clamp equipped discharge lines. Built by Baker Perkins Inc. for The Kroger Co.

Tri-Clover TRI-CLAMP union for 4" O.D flour lines. Tri-Clamp fittings are available in a full line of types and sizes to meet almost all requirements.

TRI-CLAMP® FITTINGS used extensively in Baker Perkins Pneumatic Flour Handling System for The Kroger Co.

Baker Perkins Inc. has gained an enviable reputation for their ability to plan, build and install modern, efficient pneumatic flour handling systems. Designed to meet the specific needs of today's high production bakeries, these Baker Perkins Systems make extensive use of Tri-Clover Division's TRI-CLAMP Stainless Steel Fittings.

Good example of one such installation is the Baker Perkins Pneumatic Flour Handling System shown above, designed and built for The Kroger Co., in which numerous Tri-Clamp snap-action unions are used to insure leak-proof joints that are instantly assembled or disassembled. Fabricated of sparkling clean stainless steel, these Tri-Clamp fittings are built for years of sanitary, trouble-free service.

Write for literature, or see your nearest TRI-CLOVER Distributor.

Export Department—8 South Michigan Avenue, Chicago 3, Illinois, U.S.A.

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

S157

Ole Sage Episode

OLDER EMPLOYEES SCORE HIGH
PERCENTAGES BY WHICH EMPLOYERS HAVE JUDGED THEM EQUAL OR SUPERIOR TO YOUNGER WORKERS
1939 1951
PERFORMANCE 84 92
ATTENDANCE 82 98
SAFETY 86 97
WORK ATTITUDE 94 99

Ole pulled a paper from his big briefcase. "You'll note here," he said, "that oldsters are credited as being as good or better—right down the line."

Do Older Workers Really Have What It Takes?

IVAN C. MILLER

"Food Engineering"

"TODAY," suggested Milt Sorenson, "let's skip the build-up and start right in where we left off last time. You'll remember that Ole was talking about the good records chalked up by older employees."

There were nods from the other Guff & Gripers, who were now settling back for a smoke after their coffee. So Ole Sage took the cue.

"Right you are, Milt," he said. "And first off, let me wind up last month's points concerning worker-injury experience: The studies have definitely disproved the common belief that the hiring of older persons will increase the cost of workmen's compensation. Age doesn't determine compensation rates.

"Thus it seems strange," went on Ole, with a shake of his head, "that so many employers aren't acting in accordance with that they report they believe. They generally persist in ruling against the hiring of older workers. Yet a recent survey shows that only one employer in ten actually thinks accident costs are adversely affected by taking on those over 45."

As usual, Batt Bulwark, works manager of Mull & Mull Co., was sarcastic: "I suppose Ole'll now try to prove that the more years the buzzards add on, the healthier they get."

"It might seem so, at that," chuckled Ole, "since the surveys do indicate that job attendance of oldsters is better than that of youngsters. So we can presume, at least, that either these workers are in fair health, or have greater fortitude.

"And here, too, we have some specific facts: Admittedly, the elder one are more susceptible to illness, particularly chronic illness. But a fact not generally known—or at least not sufficiently recognized—is that the drop in health due to aging is far from being a uniform decline. So health is not directly related to chronological age.

"I have some proof—the results of two surveys by the National Assn. of Manufacturers, one covering 2,500 companies back in 1939, the other 3,600 organizations in 1951. In the first study, NAM asked the employers to rate their past-40 workers on whether they were superior, equal, or inferior to younger personnel. And the later study was similar, except that older workers were re-defined as those past 45."

Thereupon, Ole pulled a paper from his big briefcase and handed it to Milt for passing around. "These are the very revealing figures," he said. They're the percentages—based on the replies from employers in those two surveys—whereby older workers were judged either equal or superior to younger employees. You'll note that the oldsters are credited as being as good or better right down the line—on performance, attendance, safety, and work attitudes. In every instance, summarizing of the ratings resulted in scores in the 80's and 90's."

Milt spoke up after he'd scanned the figures. "I'd say that all of us have probably known some individuals who were both physically and mentally old at 40. On the other hand, we surely can also recall some persons who were still vigorous at 80 and even 90."

"Yes," resumed Ole, "the records reveal that *all* age groups in the work force have people dropping out due to their failing in health. We'll have more to say about that when we discuss the matter of forcing retirement at a specifice chronological age."

Ole now slowly surveyed each of the men around the table, then said: "To get down to present cases, it would be my guess that all of you

gathered here today are over 45. As for Batt—who insists on hiring them young and husky—I'm sure that right now he's handling more men and getting out more production than he ever did at any previous time in his life. What's more, I'll bet he's not many years away from the age that most men retire.

"As for me personally" continued Ole, "well, you know I'm still busily 'at it' though I'm past the usual retirement age limit.

"At any rate, if each of you will pause and take inventory of your present mental alertness and productive capacity, as compared to 20 or 30 years ago, you will get an enlightening personal concept of this whole age question."

At this point Batt banged the table and blared, "Before we start any discussion of retirement, I want to challenge something that's been said but not proved. Ole, you stated at our last meeting that if more older workers were employed, industry would profit, and so would unions and all the rest of us, too. I ask you: How come?"

"Well," replied Ole, "we may want to go into that in more detail later. But let's just assume that a million oldsters, who are employable but now idle, were added to the work force. There would then be these several results—

"1. Increased production. *Does anyone disagree?*

"2. More spendable income for this added work group, and also for those among their relations who're now helping to support them. Further, this additional income would help sustain the increased production of these workers. *Is that all clear and acceptable?*

"3. There would be an increased number of dues-paying members of unions to add revenue to union treasuries and power to their political influence. *Isn't that evident?*

"4. National and local tax needs would decrease. *Any argument?*

"In short," summarized Ole, "we'd see the older group benefit, and industry, too. Likewise all the rest of us."

Si Worth spoke up: "I certainly agree that if more older people were employed, the demands on taxes to meet their needs would be less. But let's get clearer on all that. Just what *is* the present tax cost?

Ole explored his notebook. "I don't have the current national figures here," he said. But I do have 1945 and 1955 figures on New York State's payments to the aged from tax money. In '45, the sum was $170,000,000. And in '55, it was $883,000,000."

"Maybe," grumbled Batt, "your claim is true. But don't you think that adding a lot of old ones to the work force will limit the job chances of beginners and their advancement.

"An increase in both number of jobs and chances to advance," explained Ole, "is more or less the result of increased productivity. Then that means there's more to spend, so purchases rise, in turn requiring more production, which results in more jobs."

"I'll take that one for granted," growled Batt, "rather than get myself dizzy trying to think it through."

"Likely some of this question can be clarified," said Ed Strong, superintendent of Zenith Canning Co., "by going back to that matter of more dues-paying union members in the event that this million or so, now unemployed, went back to work. Just where do the unions stand on the old-age question?"

"All unions," commented Ole, "are more or less militant when it comes to obtaining and maintaining seniority clauses, and in insuring enforcement of seniority, especially on the job. However, only a negligible few unions insist on contract clauses that call for hiring workers past any particular age. Also, some unions have permitted clauses that require older workers to measure up to younger ones to maintain jobs regardless of seniority, indicating no real concern for eldsters.

"Don't you think," suggested Milt, "that's all because the young elements in unions are both more active and more vocal, and that they actually welcome any thinning out of the oldsters, believing that makes more room at the top?"

Before Ole could answer, Batt cut in: "I say it's now high time we hit the retirement problem. And since you, Ole, are the only one here who's been retired, and so have actual experience on the subject. . . well, you're the one to 'fill us in'."

"Yes, I'm one of the fortunate members of the older group," Ole admitted. "Not only was I retired with a modest pension, but as you know I was also retained by my company as consultant. Since then, I've had the good fortune to add sufficient clients to fill my time and also provide enough income. Generally, those in my age group aren't that lucky."

Ole again lifted his briefcase and got out another sheet. "In preparation for our discussion of compulsory retirement, I've brought along this ratio chart from the *Harvard Business Review*. Its a graph based on statistics from the Bureau of the Census."

"Here you'll note that from 1910 to 1950 total population increased 65%, but that during this same period the population over 65 years of age increased a big 208%. As you see, this rise is projected into the coming years—to show that persons beyond 'retirement age' will increase another 68% by 1975, to a figure of 21,000,000, or 8 million more than in 1950.

"In addition, there are these facts on the pre-work group reported by AMA in *Management Review*: 'Today there are 15 million boys and girls. By 1965, according to government estimates, there will be nearly 25 million. The work force must look forward to carrying an increasing load each year'."

Ole went on: "yet the trend is increasingly toward compulsory retirement. Some companies have chosen 65 as the age to drop out, others 60. In short, it's hung on chronological age, even though individuals vary greatly—some being old long before the chosen date, and others staying young long after.

"I suppose," said Ole looking around the table, "that you've wondered about the drawing of those age deadlines. Why 60 or 65? Who decides on these ages, and with what justification? You might think they were numbers drawn from a hat—is there any more reason for 60 or 65 than, say, 63, 68, or 71?"

"That may sound logical, but I still wonder," snorted Batt. "I call on you, Ole, to tackle it the other way around. Prove that people should continue work after 60 or 65."

"Well," came back Ole, "there are several ways to answer that. Here's one evident to you all: Just try to calculate the losses to the world if Churchill had quit at 60—or Bernard Baruch, Charles Evans Hughes, or Einstein. And in the line of world culture, consider the contributions to opera by Verdi at age 80, and the outstanding later writings of Shaw.

At this, Batt jumped to his feet and pushed back his chair. "If you hadn't pulled in all those foreign ringers," he blurted, "I might have stayed another minute . . ."

Laughs interrupted him, then the rest of the G&G'ers also arose. "Yes, it's late and we've gotta go, too," said Barney. See you next time!"

IMITATION RASPBERRY BY FIRMENICH

You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it with all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to give them greater sales appeal. Samples and technical data on request.

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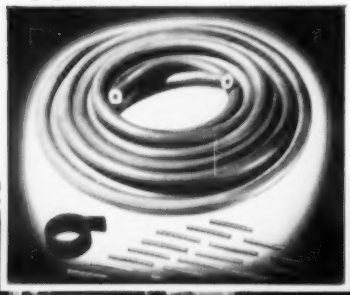
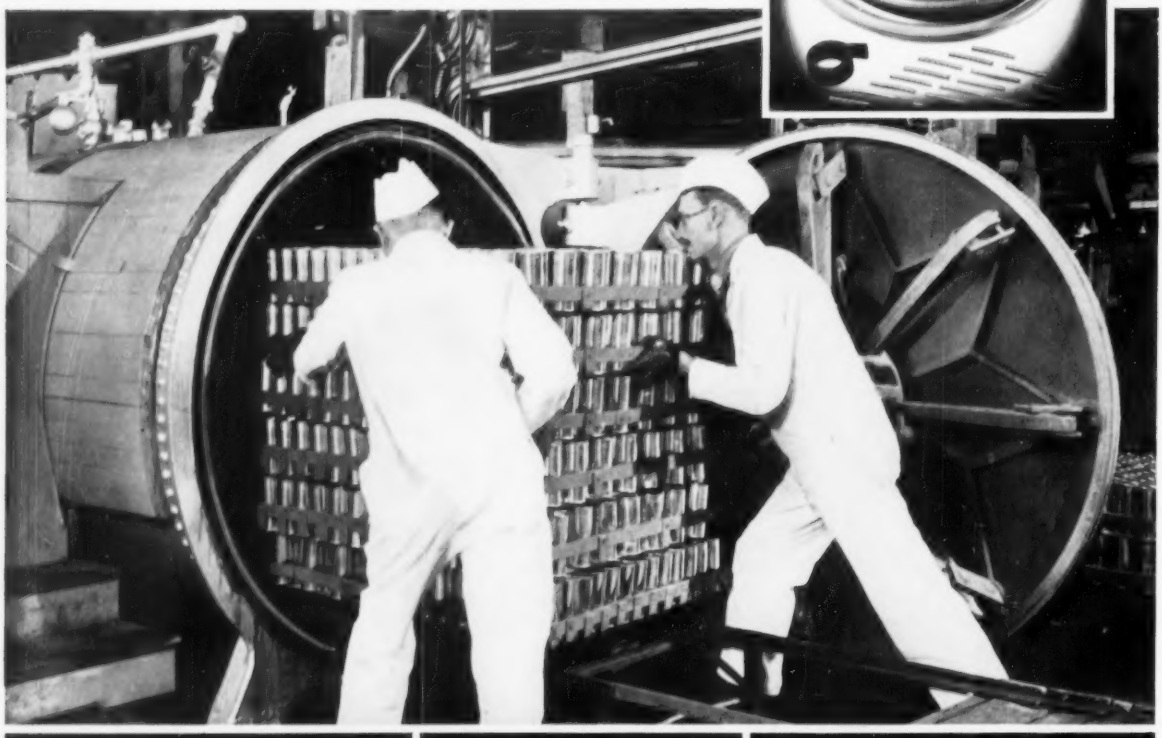
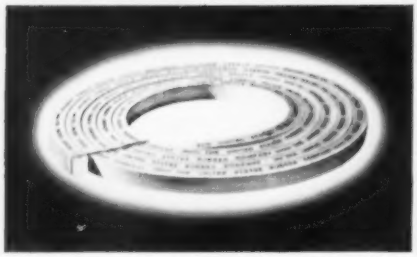
US RUBBER Cooker Door Gaskets

For Hot Cooking up to 350°

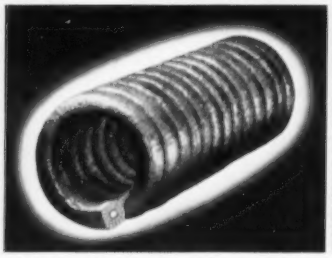


U. S. Eclipse® Red Tubular Gasketing (Style #803) is recommended especially for large exhaust heater doors and kettles where a large gasket is needed.

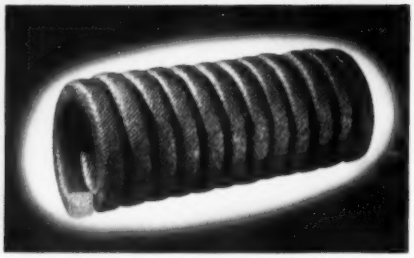




U. S. Peerless® Canvas Pump Packing (Style #463) is for use on inside packed pumps against hot or cold water, and for end rings in hydraulic sets. The method of manufacture reduces swelling to the minimum.



U. S. Low-Pressure Spiral Steam Packing (Style #381) is for use on rods and plungers against low and medium pressure steam and hot and cold water. Will not become hard in service. Lubricated and graphited.



U. S. Rainbesto® High-Pressure Rod and Plunger Packing (Style #101) handles high-pressure steam and air up to 500 degrees F. It has a non-hardening cushion, treated with heat-resistant lubricants and preservatives.

U. S. Cooker Door Gaskets are especially designed for the food processing industry . . . ideal to use on retort doors for pressure cooking, even up to 350°F. Being chemically inert, they also are fine gaskets for vats and kettles when cooking or processing soups, spaghetti, vegetables, pre-cooked meats, vegetable shortenings, and detergents. In all, U. S. Cooker Door Gaskets provide the food industry with a maximum of cooking cycles, lowering costs by eliminating the need for frequent replacements.

Insist on U. S. Cooker Door Gaskets when replacing your present ones. There are 28 strategically-located "U. S." District Sales Offices to serve you or your supplier. Or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

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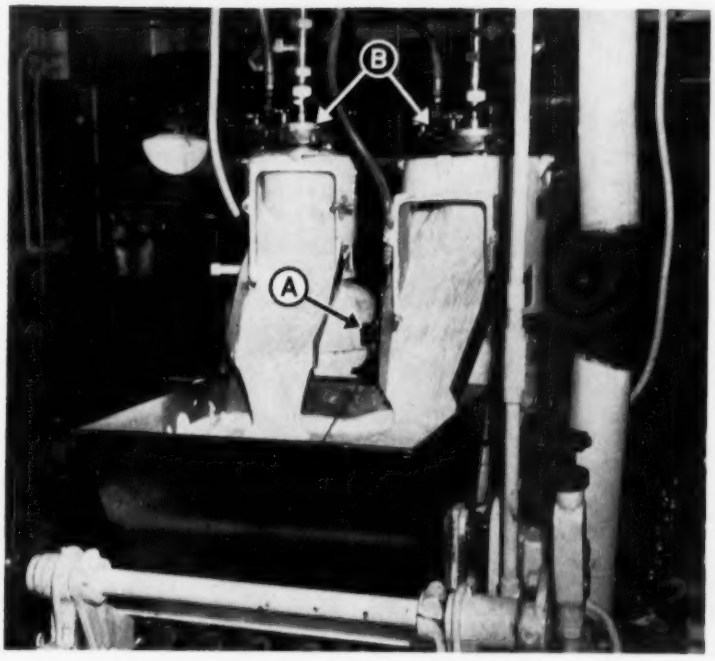
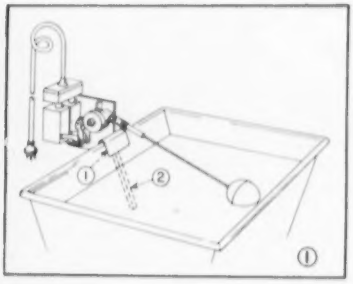
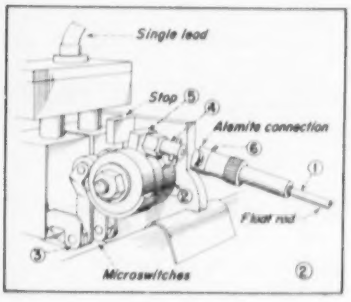
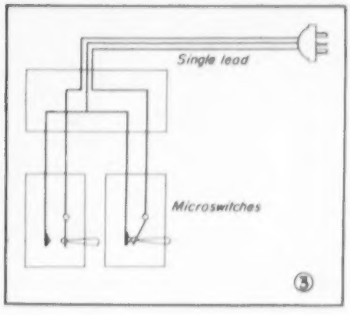
CUT OUT AND FILE

PRACTICAL IDEAS









Filler Efficiency Stepped Up

Regulating the operation of the two colloid mills (that emulsify our salad dressings) so that there would always be a sufficient amount of product in the bowl that supplies the jar filler, but also ensuring that this tank never overflows, required practical type solutions to a number of problems. The answer to each of these required meeting sanitary requirements, without increasing the time and labor requirements of the clean-up procedure.

Control Attachment and Float

General location of level controls was important since the float for operating them had to be clear of the area of discharge from the mills. Otherwise false action was almost certain to result from impact of viscous product on top of the float.

The place chosen for anchoring the controls—(A) in photo—was between the mills (B). Here the controls and operating mechanism would be drenched during clean-up, so it was necessary to make the unit detachable. This was accomplished by attaching the assembly to a lip—(1) in Sketch 1—that was formed to fit snugly over the top edge of the filler bowl and was wide enough to insure horizontal stability of the unit. Vertical rigidity was obtained by a metal bar (2) extending down the side of the bowl.

The float selected for operating the controls was a household toilet type float made of a plastic that does not impart odor or flavor to the product and is not affected by any of the product's ingredients.

Detachable Float Rod

As mentioned, the float was located beyond the discharge area of the mills, thus requiring a long float rod—(1) in Sketch 2. Also gained by this long arm was leverage sufficient to operate the cam rollers (2) that throw the Microswitch control levers (3).

Now there was danger of bending or otherwise injuring the long float rod when the assembly was removed for cleaning, unless the float unit could be made readily detachable. A number of devices and procedures were considered, and some tried out. Then the simplest one was adopted.

An Alemite grease valve (4) was

attached by threads to a lip (5) on the cam-operating disk. Then to the end of the float rod was threaded an Alemite grease gun attachment (6). When these parts are connected, the union is secure. However, they can be detached with ease for cleaning.

Two Microswitches are employed, one to stop the mill motors when the bowl is full of dressing, and the other to start the motors when the level in the bowl is sufficiently low.

To facilitate clean-up and simplify wiring, leads from the two Microswitches (see Sketch 3) were brought to a closed box, and combined there for a three-wire single lead with plug that is detachable at the electric outlet.

Control assembly now functions with precision, is easily detached, and does not interfere with cleaning the filler.—*C. D. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdell, N. Y.*

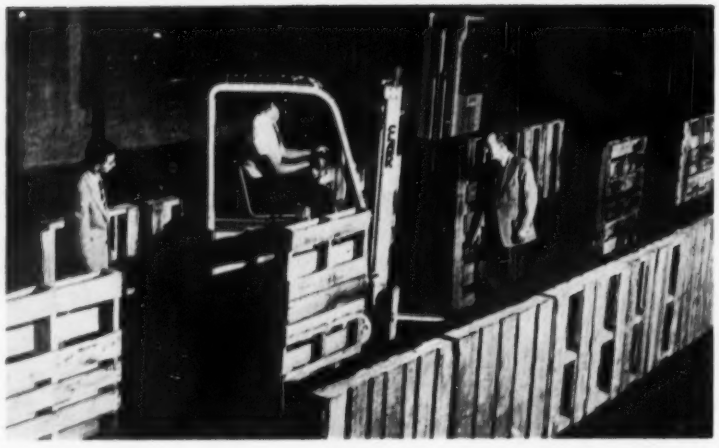
Stops Jammed Conveyor

Jam-ups on our carton conveyor no longer rip cases apart since we put in a switch to stop the belt as soon as a pile-up occurs.

The switch is located in a "dead spot" of a corner. Cases normally round the corner close to the outside of the conveyor and do not pass over the spot where the switch is.

But, when an obstruction occurs, cases quickly press into the dead space and throw the switch.

Also, further back on the line, another switch gives still more insurance against mauled cases, by sounding a buzzer and stopping the case sealer, should the jam extend back to it.—*F. Rockei, Plant Engineer, Kirsch Beverage Co., Brooklyn, N. Y.*



Upended Pallets Form Fork-Truck Obstacle Course

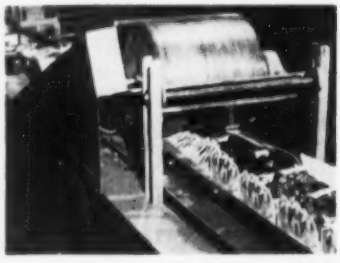
Training fork-truck operators and supervisors can be made realistic by the use of an obstacle course.

An inexpensive one can be made by using upright pallets. This system has great versatility because the pallets can be moved around to create a variety of simulated situations. Some of the exercises that can be demonstrated in this manner are drilling on pivot point (above), narrow aisle maneuvering, and freight car loading and unloading.

Problem driving sessions pertaining to actual situations can be set up, with the trainee required to solve the problems. These periods help develop skill, confidence, and good driving habits in both new and old drivers, and they also tend to break bad habits of the experienced drivers.

Coaches should be present at all times for verbal instruction as soon as errors are made.

Drivers taking the training should be physically right for the job. A medical check is needed for each one considering field of vision, reaction, timing, distance, judgment, and other possible physical handicaps.—*R. Dyment, Silver Creek, N. Y.*



Bends Carton Tabs Down

Our cartons for fresh dates have scored side tabs that must be folded before they are conveyed into the machine that applies the cellophane wrap.

Because the check-weighers were the last to handle filled cartons, we had them fold these tabs down. But,

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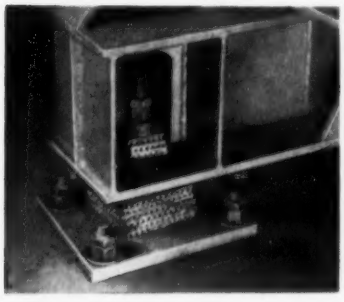
We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas, Editor FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

FEBRUARY PRACTICAL IDEA WINNER was "Simplifies Brix Tests," sent in by A. J. Morgan, Jr., Norfolk Coca Cola Bottling Works, Inc., Norfolk, Va. (Winners are chosen by Readex, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country.)

this extra manual operation slowed down the check-weighing. To eliminate it we developed this "tab-folder".

It is comprised of two side-plates, that project over the sides of the conveyor and are located just before a weighted, wetted roller. Cartons now move under the sloped plates and tabs are lightly folded. Then, under the roller that adequately folds them prior to wrapping.

Moreover, the roller, which is kept wet by a water moistened pad to obviate dates sticking to it, rolls the contents level with the carton sides —another aid to efficient wrapping —*Rupert Hamlin, Maintenance Supervisor, Packaging Dept., California Date Growers Assn., Indio, Calif.*



Neoprene Vibration Dampers

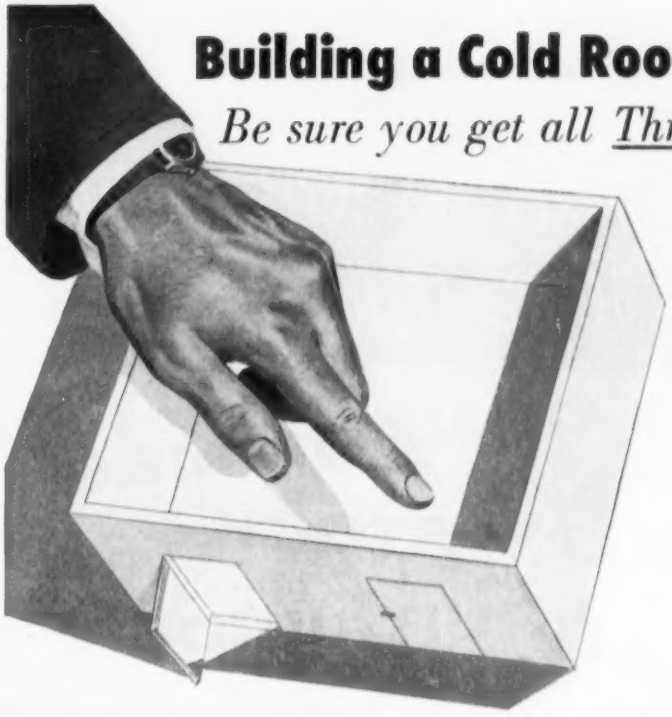
Pads of Neoprene are functioning as vibration isolators on a new natural frequency vibrating conveyor at the Franklin Sugar Refinery in Philadelphia.

The company uses a number of these machines in its large waterfront plant where raw cane sugar is received and processed. The new conveyor moves the refined sugar crystals from centrifugal filters to dryers prior to final packaging. It is about 3 ft. wide, 1 ft. deep, and 70 ft. long, and uses a single 10 hp. drive.

Location on an upper floor dictates that the conveyor's vibrational energy be absorbed, rather than transmitted via the floor to the structure of the building. The conveyor is not only dynamically balanced by a unique vibrating system that cancels out the trough reaction, but is also mounted on special Neoprene isolation pads.

These mounts were used (see photo) on the new unit, for several important reasons.

Using Neoprene pads makes it unnecessary to keep a large stock of



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Practical Ideas

isolation springs on hand. By merely changing the size of the pads it is possible to vary the stiffness, or K factor, of the isolation element.

Moreover the resilient pads are readily available and can be built up in layers to suit any particular vibration problem. Should field adjustments be necessary, the pads can simply be resized. These advantages spell design and installation economy.

Operating economies include negligible maintenance, minor replacement costs, and easy relocation of equipment.

The maintenance engineer at the Philadelphia refinery has been impressed by the simplicity and trouble-free operation of the Neoprene shock mounts. And he is especially pleased that they don't require periodic de-rusting and painting to conform with cleanliness standards at the refinery.

The Neoprene mounted conveyor was installed in Feb. 1956. Judging by his previous experience with this type of vibration isolator, the manufacturer anticipates the mounts will last for at least the life of the mechanical parts.—*"Neoprene Notebook", E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.*

Specific Gravity Unit

Our specific gravity tester for potatoes has proved to be more convenient for lab use than the Cornell potato hydrometer. Other foods could be tested in the same manner.

Normally, the Cornell instrument is used. But this device requires an 8-lb. sample of potatoes and at least 25 gal. of water. This was too large a unit for our lab. So we developed a tester that works with as little as one potato.

In operation our instrument is filled with water till it spills through

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10,000 LBS. OF POWER

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Follower rod disappears after filling—for ease of handling!

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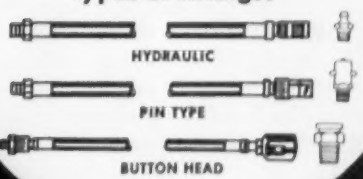

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In JENKINS *Monel-seated Bronze Gates*

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Easy replacement of the wedge only — right on the line — restores full efficiency

THE MONEL SEAT RINGS are expanded into the body to assure a positive, leak-proof joint. Exhaustive tests in typical monel-seated gate valve services show that this permanent all-around support of the rings is essential to guard against deforming, loosening, or shifting.

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GET PRACTICAL, LOW-COST RENEWABILITY in the valves you choose for the tough, punishing services that require Monel-seated gates. Compare . . . there is nothing simpler, faster, or more economical than Jenkins replaceable wedge design — and you also get the *plus* of Jenkins *extra value* in every other feature. Jenkins Bros., 100 Park Ave., New York 17, New York.

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The bronze wedge provides lasting economy for most applications. The nickel alloy wedge provides extra resistance where rapid wear and corrosion are factors.

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200 psi	300 psi
Fig. 270-U, Bronze Wedge	Fig. 280-U, Bronze Wedge
Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi Fig. 280-UX, Bronze Wedge

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LOOK FOR THE JENKINS DIAMOND

SINCE 1864 TRADE JENKINS MARK

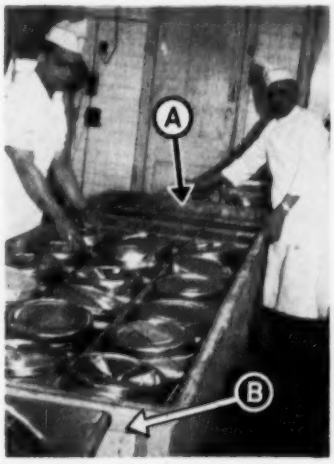
Jenkins Bros

the overflow pipe (see illustration). Then the potatoes, accurately weighed, are dropped in water. The displaced water is collected and weighed.

Specific gravity is then determined by the following formula:

$$\frac{\text{Weight of potatoes}}{\text{Weight of water}} = \text{Specific Gravity.}$$

Units of weight of potatoes and water must be the same.—*P. W. Holder, Manufacturing Manager, Loblaw, Inc., Buffalo, N. Y.*



Ends Cooling Problem

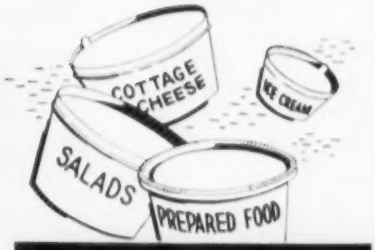
Cooling our highly viscous whipped topping mix was a problem. Our plate cooler wouldn't handle it. The flow rate was too slow and mix froze onto the plates stopping the whole operation.

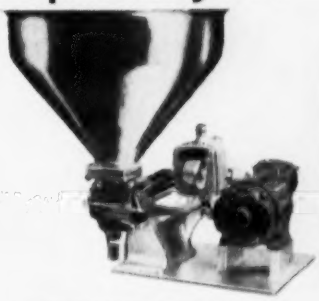
Solution was to build a tank for cooling the mix in cans (each holding 30 lb.). The cooling unit holds 30 cans separated by a removable welded divider.

A faucet (A in photo) spills cold tap water into the high end of the tank, and fills it to the level of a slot cut in the inner wall of the double lower end (B). Water then flows through the tank by gravity, overflows at the slot, drops between the walls of the double end, and empties through a drain at the bottom.

Hot mix from the homogenizer is cooled 45 min. in this tank and then transferred to cold storage. This method has proved satisfactory for our limited output.—*Jacob Rapp, Johnson's Food Products Co., Brooklyn, N. Y.*

To package Anything in Cups more profitably . . .





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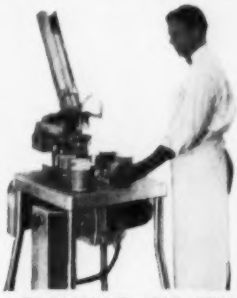
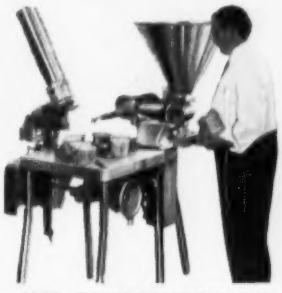
• TRIANGLE FILL-KING motor-powered automatic table-top filler makes costly hand filling a thing of the past on short runs or limited production. Handles even large curd cheese without damage. Fills 19 packages per minute with one operator. Up to 16 oz. in one discharge. Any style container. Guaranteed accuracy. Delivered from stock, ready to use.



. . . or CAP AND CODE AUTOMATICALLY with this machine

• TRIANGLE KAP-KING fully automatic cup capping machine *eliminates capping labor* — the same operator fills and caps. Use alongside *any* filling operation. Caps and codes up to 45 cups per minute (60 small ice cream cups) — any round nesting paper container, several plastic styles — up to 2 lb. or quart size. Sanitary construction. Delivered from stock, ready to use.



. . . or put them together to FILL AND CAP AUTOMATICALLY

• THE COMBINATION makes an unbeatable team for low cost automatic filling and capping with a single operator. A complete packaging unit, shipped ready to use.

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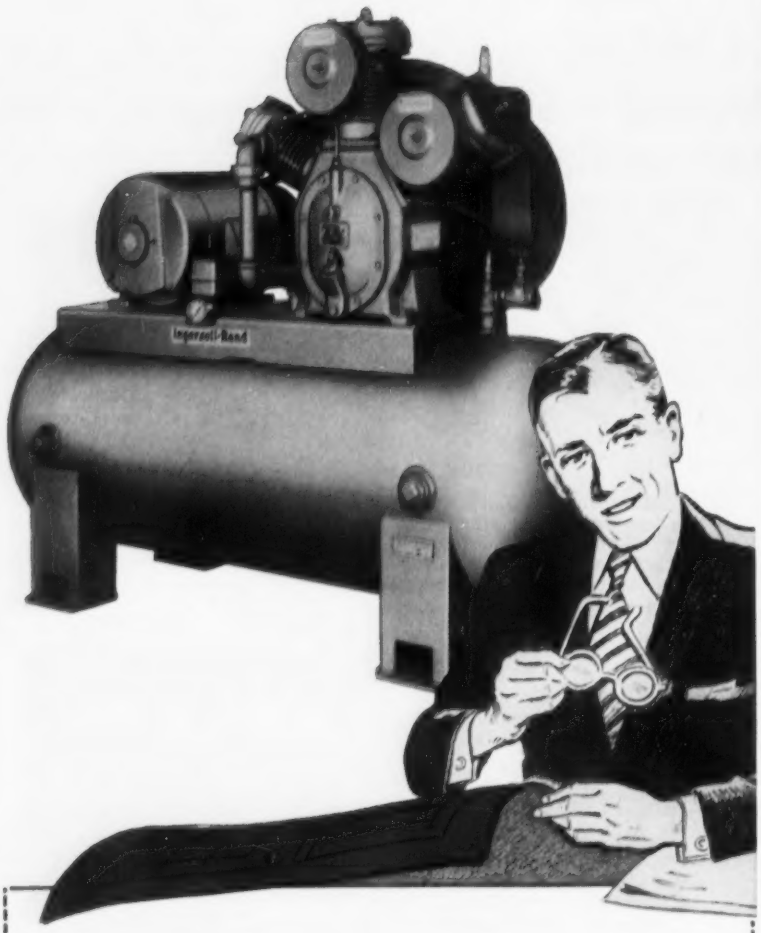

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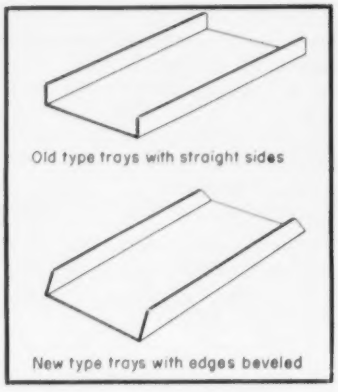
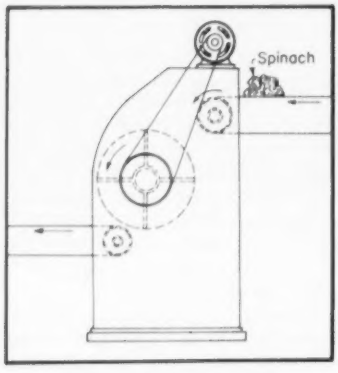


Cuts Corners to Save Trays

When loading meat into trucks, our trays (see sketch) received rough handling that resulted in bent and cracked corners.

This made frequent welding and regalvanizing necessary. Worst of all, government inspectors were rejecting trays, slowing up production.

By cutting off the corners the problem was solved. No more bent corners, no more welding, and most important—the inspectors are well pleased with the idea.—*Nick Crnobrna, Foreman, Armour & Co., South St. Paul, Minn.*



Vane-Wheel Divides Flow

Splitting incoming spinach between two inspection lines is a cinch for a paddle-wheel type unit (see sketch) we made up.

The wheel has four blades and is V-belt driven. It is located half-way down a three-sided vertical shaft. A clearance between the wheel and the back of the shaft allows a portion of the spinach to pour down to a lower belt.

The rest of the product is carried

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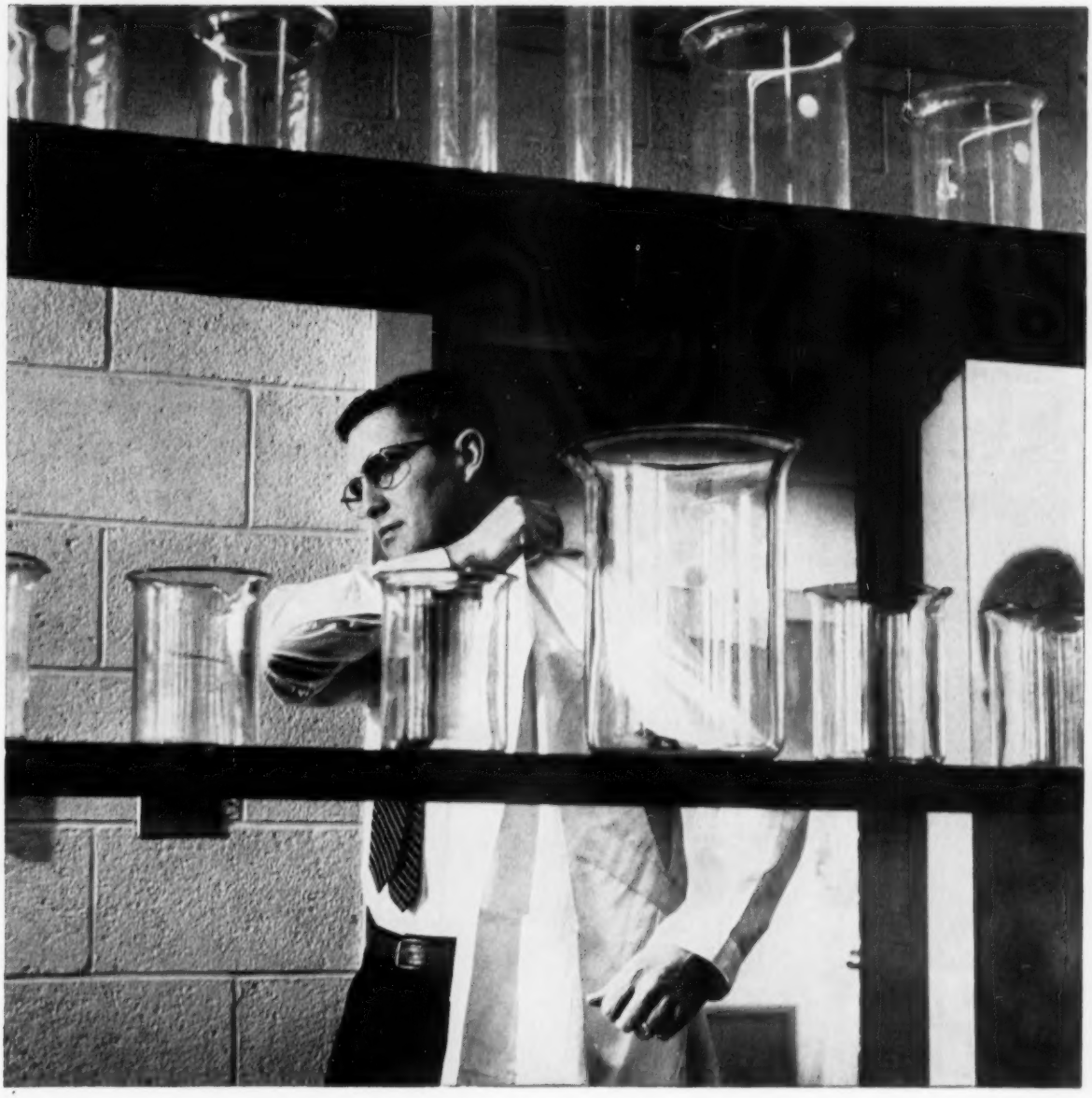

This man puts the squeeze on 6 degrees

(He sees to it that Dow propylene glycol exceeds U.S.P. Specs.)

"Shoot a sample to the lab" is not often spoken, but always enacted at every stage of processing Dow propylene glycol, U.S.P.

Every sample must answer many requirements before our chemists allow processing to continue on a given batch. For more than merely meeting U.S.P. specifications, these experts see to it that Dow propylene glycol exceeds them. Take distillation, for instance: U.S.P. interpretation calls for an initial boiling-point-to-dry-point range of 185° to 195°C. However, distillation of Dow propylene glycol must be squeezed within 185° to 189°C.–a 6° narrower range–before our chemists give any batch the "OK".

Such non-compromising procedure is another of the plus values you get from Dow to help you improve processes and win for your products an advantage in the market. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. GD 810G.

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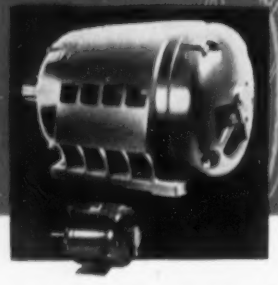
Why not build the cart before the horses?



Just tell us here at Master what you want in power drives—and get the utmost in flexibility, compactness and performance. It probably won't be as complicated as the multi-shaft Gearmotor illustrated here, with 14 shafts turning at diverse speeds. But, regardless of what you need, Master can supply the right combination of horsepower, shaft speed and mounting features with whatever Master components are required—all combined in one compact efficient unit. Just ask for information.

Motor Ratings. ⅛ to 400 H.P. All phases, voltages and frequencies.

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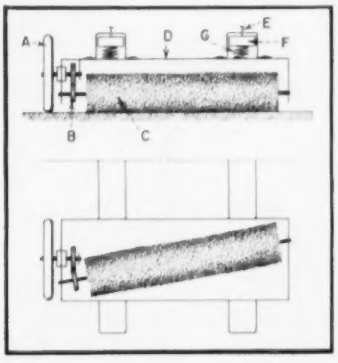
Installation.... Horizontal or vertical, with or without flanges and other features.

Power Drive Features..... Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

up by the vanes on the wheel and flop out through the open side of the shaft onto another belt.—*Webster McAllen, Plant Superintendent, Phillips Packing Co., Cambridge, Md.*



Forklift-Mounted Floor Brush

Here's how you can mount a rotating brush on a fork lift truck and cut floor-sweeping costs with modest investment.

A rubber tired driving wheel (A in sketch) is linked, through a conical transmission gear (B), to a cylindrical brush (C). This is adjustable in its frame (D).

Handwheels (E) fix the frame to forks (F) against the pressure of springs (G).

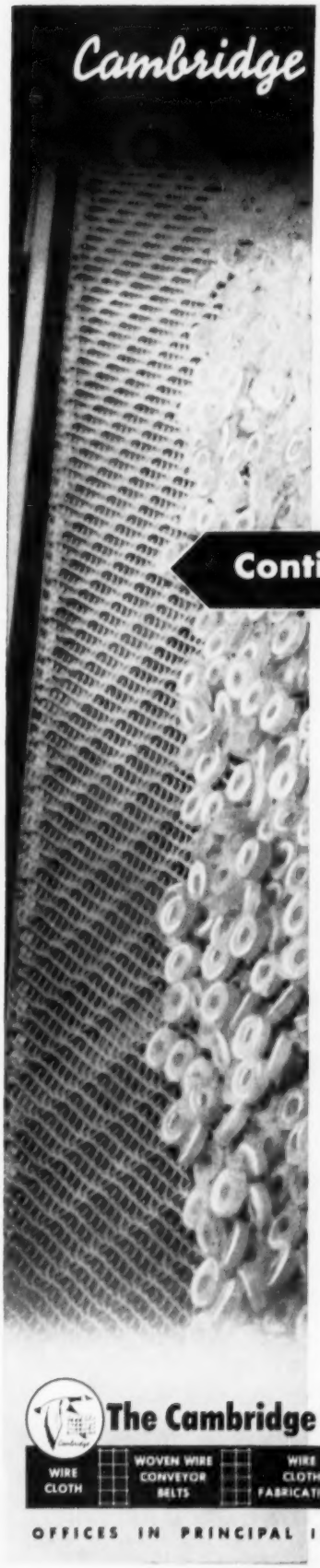
A few minutes is all it takes to attach this sweeper, and with it one man can clean over 10,000 sq. yd. of floor per hr.—*A. Willekens, Antwerp, Belgium.*

Bearing Hints

Nylon is being used increasingly for light-duty cams and bearings—because it can be operated satisfactorily over long periods without lubrication.

Since Nylon is quite flexible, care must be taken in machining it to avoid over-heating and distortion, caused by excessive tool pressures or clamping.

As with other such materials, Nylon tends to be abrasive. But the cutting tools used in machining it should nevertheless be kept very sharp. Soap solution makes a good coolant for machining it.—*Technical Bulletin, General Foods Corp.*



Wire Mesh Belts
give you
fast, uniform, continuous processing

Steady, continuous movement of meats, vegetables, candy, fruits or breads on wire mesh conveyor belts eliminates slow batch processing, costly manual handling. Using sanitary, open mesh belts to quickly move foods through washing, cooking, baking, cooling, packaging or freezing operations also helps increase production, maintain quality, reduce damage or waste.

EXAMPLE:

Continuous Cooling

MOVING BELT carries hot candy through cooling tunnel in a steady stream. Free circulation of air through open mesh speeds cooling process.

OPEN MESH also provides free circulation of heat or cold, free drainage of washing or cooking solutions. Chips or bits of the product drop through the open mesh to maintain product uniformity.

ALL METAL BELT cannot absorb odors . . . remains unaffected by processing solutions, high or sub-zero temperatures . . . gives longer life because there are no seams, lacers or fasteners to weaken or break. Rust-proof alloys maintain sanitary requirements.

SPECIAL RAISED EDGES or surface attachments are available to hold products on belt during inclined travel.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can get faster, more economical processing by using woven wire conveyor belts. Look for his telephone number under "Belting, Mechanical" in the *Yellow Pages*. Or, write for FREE 130-PAGE REFERENCE MANUAL.

The Cambridge Wire Cloth Co.

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Department Q, Cambridge 5, Maryland

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THE

BEN HOGAN
demanded perfection

HOERNER
delivered

Ben Hogan, legendary golf great, realized a life-long dream when in 1953, he established his own golf equipment manufacturing firm. Mr. Hogan, recognized as the *perfectionist* of golf, had never been satisfied with the quality of golf clubs and balls available. The Ben Hogan Clubs were born of painstaking golfer's skill, the science of the design engineer, endless patience and never-compromising determination. This same search for perfection by Mr. Hogan was carried into every last detail of manufacture, including the all-important packaging of the product.

In the first early days, a Hoerner Packaging Engineer was called in, on a "here it is — give your ideas" basis. In direct competition, the Hoerner design was chosen for beauty, economy and durability; because a golf club carton must be rugged enough for shipping, yet handsome enough for display. But Hoerner service didn't stop with the design, for the Hoerner Packaging Engineer can more often be found on the customer's production line than in the front office. And what about results?

You are invited to see the 1957 Ben Hogan Clubs in the brilliant scarlet, black and gold Hoerner boxes, at your pro shop, now!

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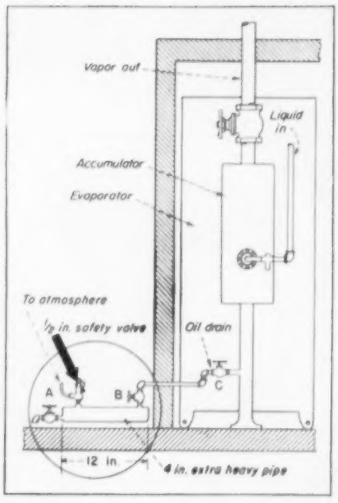
GENERAL OFFICES—600 Morgan St., Keokuk, Iowa • PLANTS—Keokuk, Des Moines and Ottumwa, Iowa Sand Springs, Oklahoma • Minneapolis, Minnesota • Fort Worth, Texas • Sioux Falls, South Dakota Fort Smith and Little Rock, Arkansas • Cajas y Empaques Impermeables, S. A., Mexico City D.F., Mexico

LETTERS



Subject: Get Safety Valve

Dear Sir:

In your March issue of practical ideas, the item, "Draining Refrigeration Oil," recalls an accident with an oil pot connected up like the one in the sketch with that item.

Would you reprint the sketch and show a ½ in. NH_3 safety valve piped to atmosphere or an NH_3 relief valve back to the low side from the circled 4-in. extra-heavy pipe, between valve A and B? [See sketch above.—Ed.]

There is no question about the oil pot working as described in your item, as ours worked the same. But one morning the operator had cold NH_3 in the oil pot (12-in. long pipe in sketch), and he shut off valve B to let pot warm up a little before opening valve A to drain.

He forgot about it, and it blew up. Fortunately he was at the other end of the engine room.

But a lighting fixture was located above the pot, and the vaporized oil caught fire. Luckily, the fire was controlled quickly.

Any NH_3 vessel should have a safety valve of adequate size if valves on it can be closed. You cannot always rely on people to remember. We all forget.

The pressure in the vessel, caused by expanding of NH_3 liquid with temperature change is enough to split a drum wide open.—*C. R. Whittier, Chief Engineer, H. P. Hood & Sons, Boston.*

THE BIG NEWS

In Blends, Emulsions, Dispersions

GAULIN

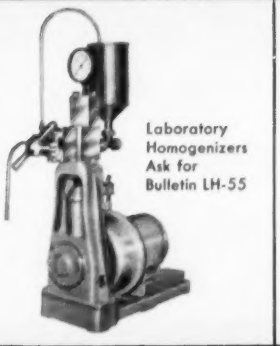
"Particle Control"

Look what Gaulin *Particle Control* can do for your product . . .

- Improve the texture, make a finer and more uniformly stable emulsion.
- Accent taste, scent and color. Lock in subtle flavors and fragrance against evaporation.
- Keep it always good to look at by stopping separation — no more "shake well before using"!

How about your product?

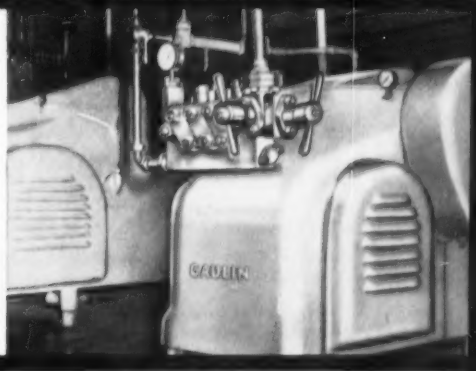
Chances are a Gaulin Homogenizer can help improve some food, beverage or chemical you make. Try this dramatic new approach to mixing and blending with a Laboratory Homogenizer for only $75.00 a month.



Laboratory Homogenizers Ask for Bulletin LH-55

New RE* Colloid Mills — Ask for Bulletin C-57

*Pat. Applied For



Homogenizers and Sub-Micron Dispersers Ask for Bulletins H-55 and SMD-55.

The G.T.A. Library of Product Information

Ask for G.T.A. — Gaulin Technical Assistance — for experienced advice and factual data on the best method to mix or move your product. Complete research and test facilities to help you. Write for FREE booklets to get you started. Manton-Gaulin Manufacturing Co., Inc., 73 Garden St., Everett 49, Mass.

Gaulin TRADE MARK

MANTON Gaulin MANUFACTURING CO., INC. EVERETT, MASS.

World's largest manufacturers of homogenizers, colloid mills and triplex high pressure pumps.

New A-Line models range from ½-ton Pickups through 33,000 lbs. GVW Six-Wheelers.

NEW ACTION-STYLING! MORE USABLE POWER!

Here is the crowning achievement of fifty years of quality truck production – the great new Golden Anniversary INTERNATIONAL Trucks!

They're *Action-Styled* with fresh, clean functional lines that set a new style pace.

They're powered by new engines that put out more *usable* horsepower – including the most powerful "six" available in its field! They have exclusive new cab mountings for quieter, more level ride. New brakes, new steering, new frames – and many other new features.

The result is a new line of trucks that – more than ever before – are built to cost *least* to own!

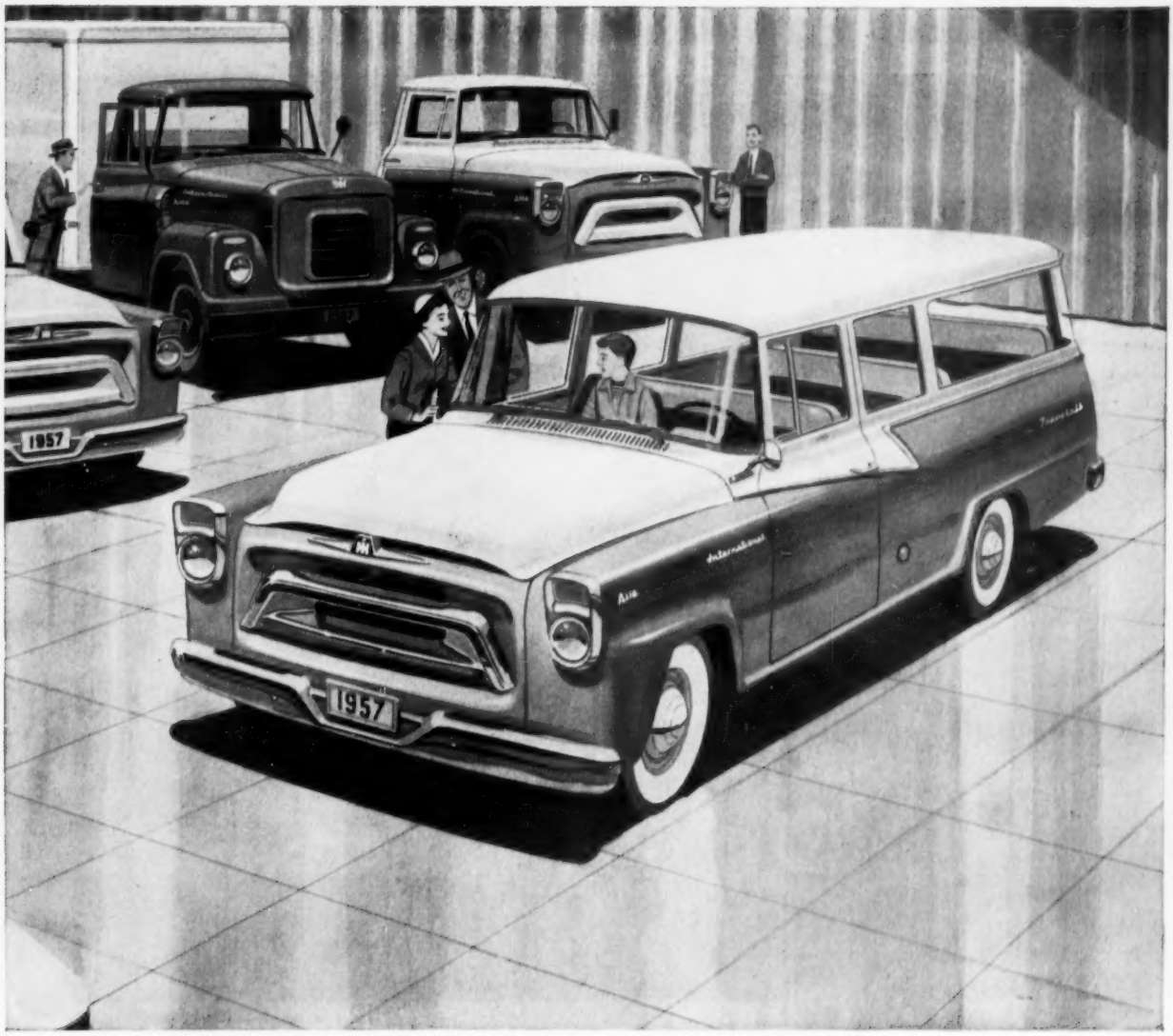
See and drive these newest INTERNATIONALS *today!* International Harvester Company, Chicago.

Trucks Unlimited... Powered for Modern Traffic... Plus Modern Comfort

Handsome "Golden Jubilee" Pickup with the *longest* all-steel body in its class. Only Panel with third door. New 8-passenger Travelall® models. New cab-forward models with ideal 89-inch BC dimension. Tractors to 48,000 lbs. GCW. Wide range of all-wheel-drive trucks.

Redesigned engines produce *increased* power without strain from new combustion chamber and valve position . . . more usable power that's "bred for the job". . . at low rpm to keep operating and maintenance costs low. New quick-starting 12-volt ignition.

Biggest windshield – 1,181 *sq.* in. – and *widest* cab in their class! New "Silent-Vent" door wings. New, wider front and rear springs. Exclusive level-riding 5-point cab mounting. Bigger brakes with more lining area, larger cylinders and boosters for quicker, easier stops.



Other INTERNATIONALS, to 96,000 lbs. GVW, round out the world's most complete line.

NEW Golden Anniversary INTERNATIONALS

Cost least to own!

Motor Trucks • Crawler Tractors • Construction Equipment
McCormick® Farm Equipment and Farmall® Tractors

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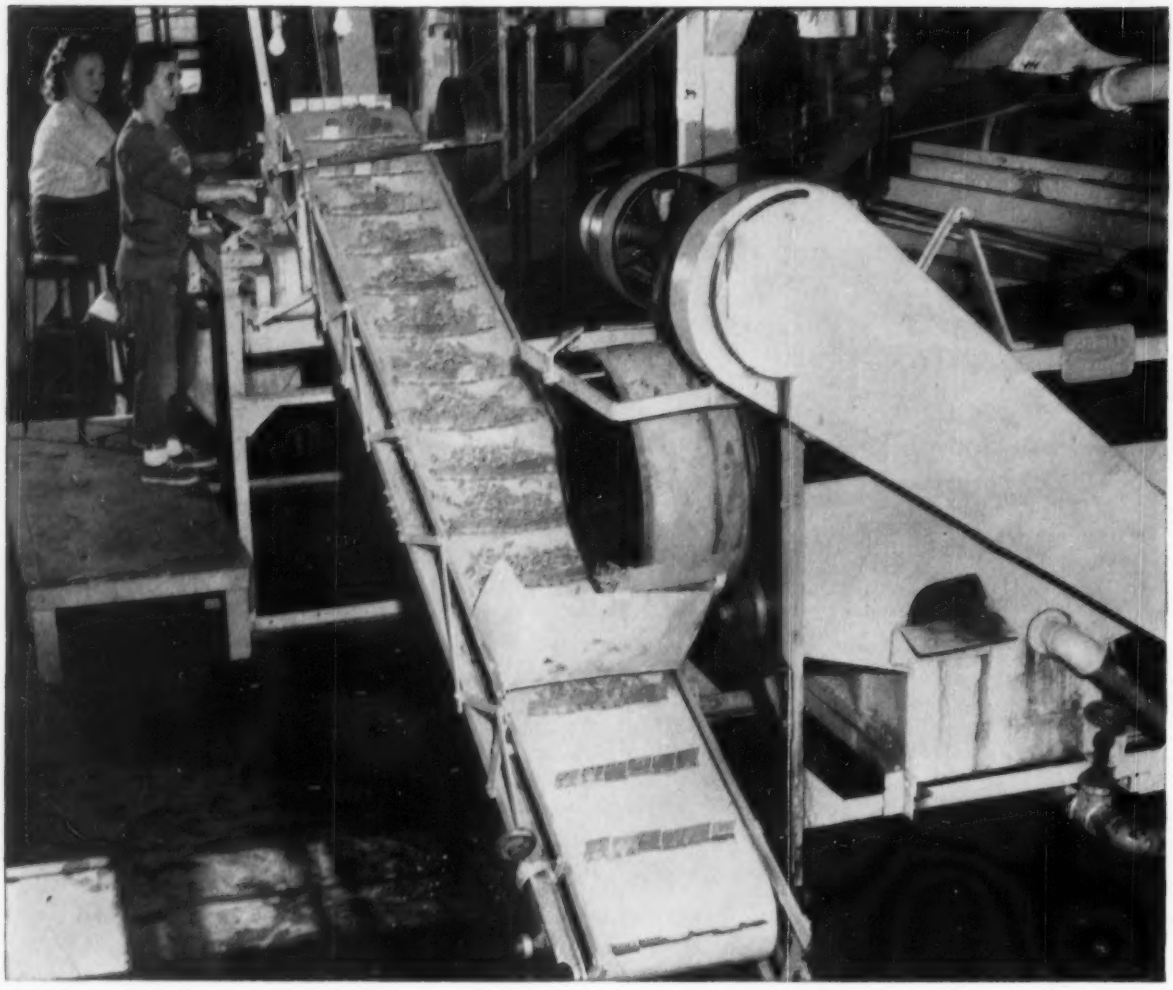
B.F.Goodrich report:



Where clean-up time was cut from one hour to 5 minutes

Problem: When a bucket conveyor was used to carry vegetables in this canning plant, cleaning and maintenance were serious problems. It took more than an hour to wash the conveyor down, and even with a steam gun it was hard to clean.

Oil couldn't be used to lubricate the conveyor, so rollers and rods carrying the buckets wore out quickly, caused costly shutdowns.

What was done: Then a B.F.Goodrich distributor suggested they try a Koroseal belt, with stainless steel cleats riveted to it. Because the belt is made with Koroseal flexible material, it resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid.

Savings: Since food juices can't soak into Koroseal's smooth, polished surface, this belt is a cinch to clean. In just 5 minutes this Koroseal belt is as clean and new looking as ever. The Koroseal belt had been on the job two seasons when the picture was taken, and is expected to last at least another three years. There have been no maintenance or repair costs.

Where to buy: Your B.F.Goodrich distributor has full information on the Koroseal belt described here, and he can also tell you about the complete line of belts B.F.Goodrich has developed for the food processing industry. *B.F.Goodrich Industrial Products Co., Dept. M-933, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich

INDUSTRIAL PRODUCTS

FDA Additives Bill Contains Booby Traps

There is special cause for concern about the chemicals-in-foods additive bill recently introduced by the Food & Drug Administration.

This bill might well receive more than normally favorable reception from Congressmen. It stems from a highly respected and ostensibly impartial government agency. It was introduced with White House "clearance." And it includes a couple of apparent compromises to appease industry.

But contained in the proposed legislation are some provisions that are contrary to the best interests of both the industry and the public.

FDA's proposal would require industry to pretest and obtain approval of all new additives, the latter requirement being opposed by industry. Existing additives considered safe by experts would be exempt from such testing, a point of compromise on FDA's part but one still not satisfactory to industry.

Another concession by FDA is the provision that safe-use tolerances be established for ingredients that are toxic only in large amounts. The present law bars use in any quantity unless an additive is judged completely harmless.

Grants FDA Dangerous Power

The bill would allow an FDA decision to be appealed to a federal circuit court—but only on the question of the legality of the decision. Industry insists on the right to full-fledged trial on both legal and scientific issues. And it better keep on insisting, unless we want to risk one-man dictation as to what can and can't be introduced into foods in the interest of progress.

Federal control of advances in food quality and convenience is further strengthened by another provision. The new bill requires that utility be proved unless a new additive be "harmless." This may seem reasonably innocent on the surface. But utility would be decided by the Food & Drug Administrator. And suppose he be a zealot, with a mission to see that people eat foods as nature made them. Then he could, with legal impunity, bar worthwhile additives. That would impede progress in food manufacturing and discourage research on new ingredients.

This FDA bill should not be passed. Even though leaders in the food and chemical industries are weary of fighting for the right kind of chemical additives legislation, they certainly ought not to settle for such compromises as have been made to date by FDA. The bill gives too much power to FDA, and it would permit "legislation by regulation."

Simple Amendment The Answer

Yet the delay in strengthening the pure food law already has been too long. With new additives being developed at an accelerating pace, there should be a requirement that industry report in advance its plans to introduce products containing new additives. This would automatically alert FDA, and it could take action if it does not consider a new additive safe.

So why not make a simple, non-controversial amendment to the law to that effect? And do it right away?

That would protect the public, and without risk of FDA dictatorship or impediment to progress. FDA already has power to protect consumers against any food or ingredient considered dangerous to health.

Add that one simple provision to the law soon. Then let the legislative protagonists squabble as long as they want. They could do so without risk to public health.

World's Largest Sea Water Salt Plant Proves Crane Valve Quality

Three times longer valve life on corrosive weak brine

Before Leslie Salt Co. changed to Crane diaphragm valves here in its Newark, Calif., plant, lubricated plug cocks were causing constant maintenance. The highly corrosive condensate and weak brine solution being handled pitted the plugs, started leakage, and forced replacement of the cocks every 2 years.

To date, the Crane neoprene-lined diaphragm valves have already given 3 times longer service than the cocks. In these valves, the diaphragm isolates the working parts from line fluid, and the neoprene lining protects the disc and body. Result: after 6 years of cost-free usage, the Crane valves are still seating tightly with easy operation.

Valve performance like this can only come from correct design, better materials, precision assembly, and thorough testing—features you cannot detect from outside appearance. Why gamble with your valves and fittings? Specify Crane and be sure of top-quality flow control.

Get Crane Folder AD-1942 on packless diaphragm valves. See your Crane Representative for a copy, or write Crane Co., address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Labor Production Standards *Shouldn't Scare You*

—And they definitely won't, once you shape them up along the lines of the easy working pattern set down here by Professor French

CHARLES E. FRENCH
Associate Professor, Department of Agricultural Economics, Purdue University, Lafayette, Ind.

"FRIGHTENED" is the word for many plant operators when mention is made of labor production standards.

True enough, production standards aren't built easily. But what scares most persons is merely their lack of understanding as to what's *needed* in such standards.

Basically, you just need to know two things: (1) How many pieces of work must be done to complete the specified unit of output, and (2) how long it takes to do each of these component pieces of work. Simple—but so often misunderstood.

You can break the work into either a lot of pieces or a few, depending upon the particular work, and what you expect to do with the production standard once you have it. Usually, you have a good prior idea of the level of breakdown that is sensible, especially if you have any job descriptions—which you should have.

The standard is generally designed for either one, or a combination, of the following purposes: Comparison of one method of work with another, basis for wage plans (incentives, etc.), cost estimates, guidances of the worker on expected performance, scheduling basis for foremen, coordination of men and machines.

Once you pinpoint your need for the standard, your judgment will go a long way in telling you the number of pieces into which you should break the work.

JOTTING FORM aids you in separating "same" from "variable" pieces of work, also "single" from "multiple" actions.

Tying the number of pieces of work to a "unit of output" is important. Decide upon your most logical unit—a hundredweight, basket, can, truck load, or whatever best fits.

With the output unit in mind, we are ready to break the work into pieces. Basically, we try to sort out like pieces. We use these guides:

1. Select a clear-cut beginning and end for each piece of work. For in-

stance, packing a bottle of olives may be considered as starting when the empty bottle is taken from the supply of empties, and as ending when, after filling, it is passed on for capping. Look for regular, definite end points, such as the fall of a finished case onto a conveyor or the flash of an inspection light on a belt.

2. **Break the work down into small pieces.** This is excellent insurance for the person inexperienced in this type of thing. For example, your standard might show the time for filling a 24-bottle case of mustard. But suppose it is then decided to use a 36-bottle case. If your breakdown shows the time to case each bottle, you can then easily figure for the new case size. However, if you merely took the overall time for filling whole cases, you will probably have to run a new time study.

The point is that it's simpler, in production-standard projects, to put small pieces of work together than to take large ones apart.

3. **Separate hand work from machine-paced work.** Work paced by a machine, such as stacking of goods off a conveyor, is usually much different from hand work, such as unloading a dolly of supplies. Remember that machine speeds are often varied. Be prepared to adjust for this by having these machine-paced pieces of work sorted out.

4. **Separate constant pieces of work from those that are variable.** A constant piece is one such as putting a lid on a carton. It's *constant* regardless of size of carton used. A variable piece of work is one such as filling. For example, the time per carton likely *varies* if you shift from filling 12-oz. cartons to filling 16-oz. ones.

5. **Separate regular pieces of work from irregular pieces.** A regular piece is one that occurs a *regular* number of times for each output unit. For instance, you may regularly glue each box once. An irregular piece is one which you tend to change *irregularly* from time to time.

For example, you may revise your inspection rate—making it a check of 1 out of 100 on a certain product instead of 1 out of 500, and then later you may switch it to 1 out of 250. Production-standard adjustments are simple if irregular pieces of work, such as these inspections, are separated from the others.

To determine how often the pieces of work occur for each unit of output is possible. A little logic and good judgment will give you such data. Analysis of plant records will give you many others. Time study can be used on knotty ones.

Two Main Classifications

We now have, basically, two main classifications to make for each piece of work:

First, some pieces of work take the *same time*, regardless of day-to-day alterations we make in such things as size of our basic unit, where we move it, or machine speeds. But for other pieces of work, the *time will vary*. These two—the pieces of work that take the same time and those where the time varies—should be separated.

Second, some pieces of work occur *once* for each basic unit produced, while others may occur *more or less than once*. Separate these. The best way to do this is with a worksheet. The one illustrated was employed by us in planning a production standard for a milk plant.

The job of putting the pieces together to form a standard is really the easy part. It is ironical that this phase has scared many people away. Let us take a simple illustration:

Assume we are processing baskets of some food. First in the routine, we get a basket (this takes .2 min.). Next, we get 10 lids, a supply to last for 10 baskets (.4 min.). We now fill the basket (we may from day to day fill different-size baskets, but we know that we can fill any size at the rate of .01 min. per lb.). We check-weigh every 20th basket (.4 min.). We put a lid on the basket (.1 min.). And finally we move the finished product to the storage room (we sometimes move the baskets to different storage areas, but we know that this takes .03 min. per foot moved, regardless of the storage area chosen).

We want a production standard that will give us our production level for 60-lb. baskets moved 30 ft. to storage. Furthermore, we don't want to construct a completely new standard each time we change basket size or storage area.

With the findings just detailed, we now can pattern a simple production standard (shown in second illustration).

This standard, we hasten to say, lacks allowances for personal time, rest periods, machine breakdowns, etc. Be sure to include these factors in your considerations.

Note that we handled two of the pieces of work—fill basket, and put in storage—differently from the others (see illustrated standard). This is because they varied as unit of output varied. Tomorrow, if we run 30-lb. baskets and store them 20 ft. away, we merely insert these figures under "Variable Factors per Basket." Then, after the necessary corrections, we have our new standard. This saves much work in cases of change in variables.

Likewise, you can see that it would be easy to evaluate the effect on our standard time if we decided to check-weigh every 30th basket instead of every 20th one.

Of course, the sample standard we have presented is very simple. However, you can go on from here to make the more complex production standards.

Here's Example of a Simple Standard (Basket-Filling Routine)

Piece of Work	Time Per Variable Factor	Variable Factors Per Basket	Time Per Piece of Work	How Often Per Basket	Weighted Time Per Basket
Get basket	——	——	.2	1	.20
Get lids	——	——	.4	1/10	.04
Fill basket	.01 min./lb.	60 lb.	.6	1	.60
Weigh	——	——	.4	1/20	.02
Put on lid	——	——	.1	1	.10
Put in storage	.03 min./ft.	30 ft.	.9	1	.90

Output per hour..... 32 baskets Total time per basket..... 1.86 min.

Food Texture Rapidly Gaged With Versatile Shear-Press

Maturity, firmness, fibrousness, and juiciness—these are quality factors accurately measured and recorded by this easily operated test unit

AMIHUD KRAMER
University of Maryland, College Park

IF CONTROLLING the texture of your product is a problem, this new-model shear-press may well provide the answer.

Versatile and accurate, it rapidly measures and records such quality factors as—

1. **Maturity of raw peas, lima beans, and southern beans.**
2. **Firmness of raw and/or canned apple slices, beets, spaghetti, chicken, beef, and shrimp.**
3. **Fibrousness of asparagus and string beans.**
4. **Succulence of sweet corn and apples.**

Furthermore, this unit may be used either in the field, on the processing line, or as a research tool. It's a modification of a shear-press originally designed for checking tenderness of canned limas (FE Apr. '51, p. 112).

What It Comprises

Basic components of this model are: (1) A sample box having upper and lower horizontal grid plates; (2) a test cell consisting of vertical stainless-steel blades that mesh precisely with the sample box; (3) a proving-ring dynamometer; (4) a fast-returning piston; (5) a hydraulic drive system providing automatic limiting pressure; and (6) measuring and recording attachments.

The test cell is attached directly to the proving ring, an arrangement that eliminates a major source of frictional error. Thus, force developed by resistance of a food to shearing or compression is transferred directly to the measuring system.

The hydraulic drive may be adjusted to move the piston at any rate from 15 to 100 sec. per full stroke. For the standard unit, primary hydraulic power is obtained from a gear pump driven by an electric motor. For field use where electric power is not available, the motor may be replaced by an air-pressure accumulator.

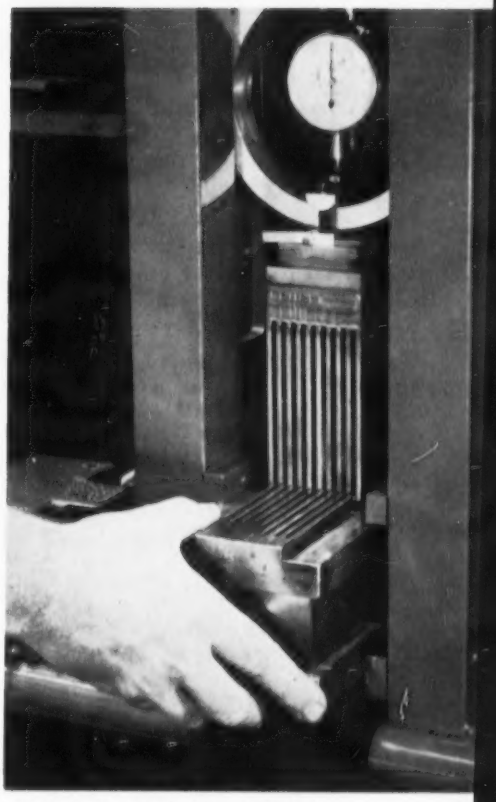
In Action

In operation, a sample is placed in the box, then latter is slid into the press. Pressure applied to the piston is transmitted to the test cell to force it down and through the sample box. Resistance to this force is measured by subsequent compression of the proving ring.

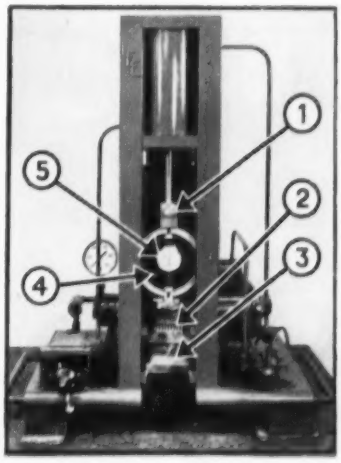
The unit's dynamometer is similar to those used for calibrating test equipment. Fixed-point resolution of 0.5% may be obtained from individual calibration curves, and different rings are available for relatively soft materials and for harder products (various ranges to 5,000 lb. pressure).

Readings may be taken from gages fitted into the proving ring, or produced electrically by use of transducers. Where an electrical measuring device is used, a recorder may be attached to show a time-vs-force curve for the entire stroke, rather than just a maximum-force reading.

This modified press is the culmination of a five-year research project at the U. of Maryland, in cooperation with the Laboratory of Electronic Engineering, the Quality Evaluation Section of USDA's Agricultural Marketing Service, and a number of food processors who pioneered use of the shear-press under commercial conditions. —*End*



COMPACT UNIT gives quick checks on foods. Closeup of sample box (being inserted into machine) shows positive meshing of its top grid with blades of test cell above.

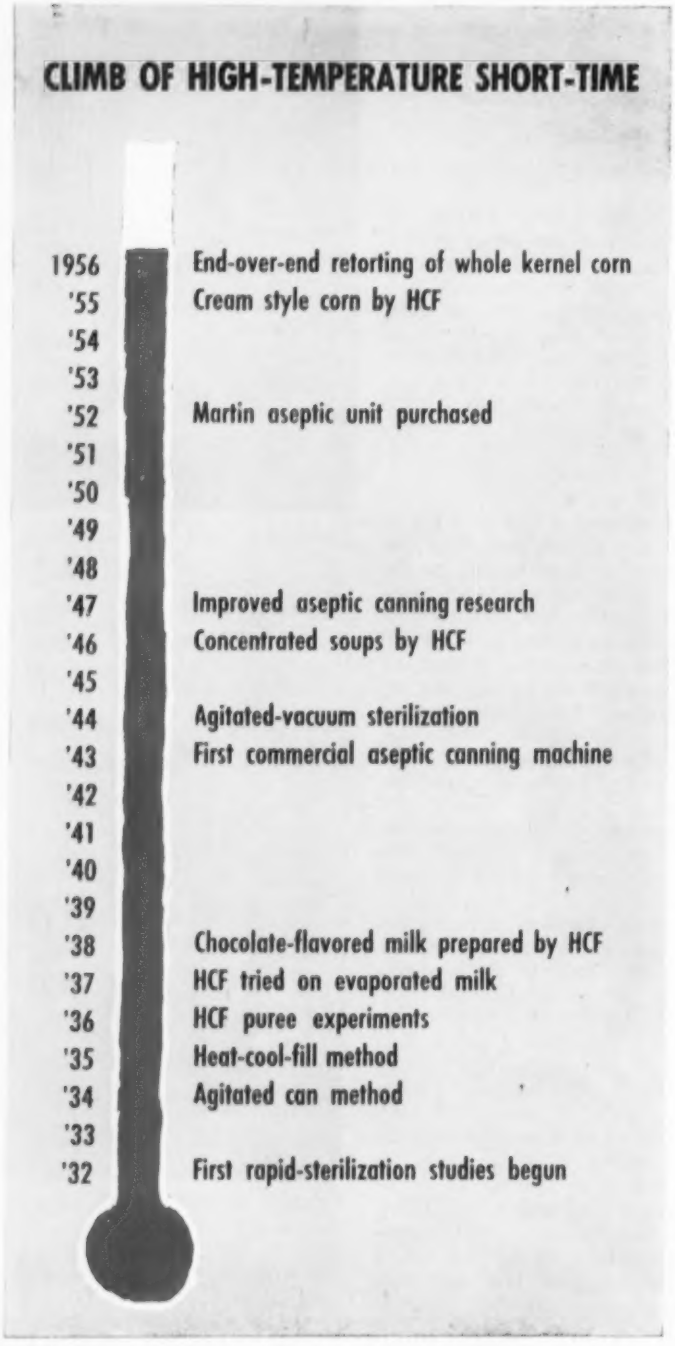


LATEST SHEAR PRESS employs hydraulically driven piston (1) that forces test cell (2) through sample box (3). Resistance of item, measured by compression of proving ring (4), is indicated on gage (5).

HTST Is Nearing the Top

Striking Progress Achieved in Promoting Quality

New successes with tomato juice, corn, and cream soups detailed . . . How the various methods have been carried from lab concept to implementation . . . Contributions of research over last 25 years



O. F. ECKLUND and P. SOGNEFEST
American Can Co., Barrington, Ill.

PAINSTAKING SEARCH for the ultimate in high-temperature short-time food sterilization has paid handsome returns.

Specifically, American Can Co. researchers have come up with canning techniques that not only assure food of better quality and shelf-life but that also realize continuous-flow advantages.

Outstanding among these techniques are—

1. **The agitating vacuum process for whole kernel corn.**
2. **The HCF process (heat, cool, fill) for chocolate milk, cream, creamed soups, and other products.**
3. **Modified HCF employed in flash processing of tomato juice (using only partial cooling before filling).**

Relative to the latter, it is quite likely that increasing amounts of creamed soups will be packed by the HCF method. This procedure enables preparation of premium products that retain good quality at room temperature. A potential market is seen for HCF quality soups in institutional size containers.

Custard desserts, ice cream mix, and flavored milk drinks should also find a good market. On the other hand, HCF-processed cream style corn, which has premium quality and storage stability, may not be economically feasible because of high capital equipment costs for the short canning season.

Of course, evaporated milk is the product that most fascinates technologists who have worked with high-short processing. Excessive cooked flavor of the conventional product is so common that such a taint in almost any product is known as a 'canned milk' flavor.

The vast amount of inconclusive work expended on HCF-processed evaporated milk perhaps should dampen enthusiasm for this process. However, recent experiments have indicated that a much improved product having adequate, if limited, storage life can be prepared by the HCF process. Difficulty is that addition of the necessary stabilizer is not yet permitted under the Standards of Identity.

Research in high-temperature short-time sterilization has received a major portion of our attention for more than 25 years. For this type of sterilization seems to offer the best hope of quality improvement. The much greater lethality of higher processing temperatures to spoilage organisms is evident from thermal death time curves.[1, 2] The calculating factor commonly used today is a tenfold increase in lethality for every 18-deg.-F. rise in temperature.

However, with slow-heating products, the calculated reduction in processing time with high temperature sterilization, when using conventional retorting methods, is only slight, and results in poor quality due to overcooking of the outer portions of the can contents.[1, 2]

The year 1932 saw the launching of comprehensive studies aiming to develop rapid sterilization procedures for canned foods. Since then, the following have been carefully researched: Pressure filler cooker (PFC); agitated can; sterilizing and closing (SC); heat, cool, fill (HCF); and agitating vacuum.

Three of the positive results have been indicated at the start of this article. We have seen HCF developed to a commercial stage, with more than 10 yr. of successful production. Flash sterilization of tomato juice followed by hot fill is being used extensively because it destroys a troublesome spoilage organism without overcooking the product. And the packing of the kernel corn by agitating vacuum has gained quality advantages.

PFC Processing Detailed

In the PFC method, a Canco No. 1 high speed vacuum closing machine was equipped with auxiliary chambers and adapted to maintain steam at 20 to 30 psi. (see photo). The food was forced through a spiral tube, where it was heated to 250-270F., and then went into a can in the filling section of the closing machine. Next, the filled can was closed and discharged into a chute, where it was rolled along a short track and then held to complete sterilization of the product. Then the can was valved out of the machine and cooled in water.

The operation was manually controlled, seven men being required for a production of 3 cans per min. Any error in the proper sequence usually resulted in a jam which was difficult to clear.

Experiments with evaporated milk showed that a fairly good product could be packed by the PFC method. When diluted to whole milk consistency the freshly packed product was judged to bear more of a resemblance to fresh pasteurized milk.

After extended storage periods, however, the milk darkened slightly and developed an evaporated milk flavor. Further, the product was less stable than regular canned evaporated milk—there being excessive cream separation and jelling after 6 to 10 months storage at room temperature.

Points on Agitated Can Method

In 1934, a program based on the agitated can method of processing was begun.[4] In brief, an increased rate of heat transfer, as compared with conventional methods of processing, was obtained by agitating the filled cans during processing and cooling. The precedure involved rotating of the cans end over end in the reel of an experimental Ft. Wayne retort.

Under the most favorable conditions, milk sterilized by this method was nearly equal to that processed by the PFC method. Both methods, however, failed to produce evaporated milk having the desired storage stability.

Added correctives and variations in forewarming and evaporating procedures failed to improve the shelf-life. With both processes, lower temperatures and longer times improved storage stability, but increased the cooked flavor. It was clear at this stage that chemical changes resulting from the fortunate combination of temperature and time used in conventional evaporated milk processing provided greater storage stability than that obtained by high-temperature short-time processing techniques.

The SC method was designed to handle discrete particle foods, such as whole kernel corn, peas, diced beets, shrimp, and the like. The procedure is to subject filled, inverted open cans (product held in the can by a perforated plate) to a jet of steam in a steam chamber. This rapidly heats the product to the temperature of the steam chamber. Then the can is uprighted, filled with hot sterile brine, sealed, held at chamber temperature to complete sterilization, and water cooled.

Following preliminary work, a commercial size unit, named the SC machine (see photo), was built and installed in a canning plant for experiments and semi-commercial packing of various vegetable products. High quality packs of whole kernel corn, diced vegetables, green and wax beans were made. Some spoilage was caused by recontamination through the top doubleseam. Seam formation and softening of the non-heat resistant sealing compounds of that day were found to be causative factors. Because of the spoilage and mechanical difficulties with the machine, work with the SC method was suspended.

Heat-Cool-Fill Studies

In 1935, during processing studies of baby foods and cream soups by the PFC method, quality advantage was gained by cooling the product below lethal temperatures before filling aseptically into sterilized cans. Thus the (HCF) method was originated.[5, 6, 7] Here, the product is sterilized by rapid heating and cooling during passage through a heat exchanger. Then comes aseptic filling and sealing in sterilized containers.

This method may be termed—at least in theory—the ultimate in heat sterilization of foods. It permits use of the best method to heat and cool the product rapidly without any restrictions imposed by the container. Subsequent filling into sterile cans and closure under aseptic conditions need not have any adverse effect on the product.

Practically speaking, HCF has been applied only to products sufficiently fluid to allow them to be pumped. This includes not only liquids like milk, but also thick

products such as pumpkin, creamed soups, cream style corn, and chop suey.

First of the HCF studies included tests with packs of pureed vegetables and creamed soups, and they showed that this process could improve canned foods. In 1936, the work was expanded to include cream style corn, chop suey, and pumpkin. With a tubular heat exchanger, extremely good cream style corn was packed—the color and flavor being almost identical to the freshly blended product.

Because flavor improvement was demonstrated by earlier high-temperature short-time packs of evaporated milk, it was inevitable that processing of this product by the HCF method would be studied. In the period 1937 to 1945, comprehensive studies of evaporated milk were accordingly carried out.

Numerous correctives that had been found effective in conventional milk processing were tried and found to be ineffective in preventing the gel formation that limited storage life of the HCF product. Added stabilizing substances, such as agar and algmate, increased the viscosity and retarded cream rise. However, they did not alter the tendency to gel within 3 to 4 months, at room temperature. Also use of stabilizer in evaporated milk shipped interstate would require a change in the FDA Standards of Identity for evaporated milk.

Other processing modifications include: (1) Different holding times before processing, (2) different forewarming procedures, (3) variations in homogenizing pressure, processing times, and temperatures. However, no method was found that would provide the desired storage life for evaporated milk.

Several years of research, in cooperation with another laboratory, culminated in commercial production of HCF-processed chocolate-flavored milk. Work was started on this project in 1938 and a commercial aseptic canning machine capable of packing 200 cans (12 oz.) per min. was built in 1943. This unit was replaced by two 300-cans-per-min. machines in 1947.

The HCF process, when adapted to tomato juice[5, 6], overcame a spoilage problem that had plagued operators for many years. During the late '30s, tomato juice canners experienced substantial spoilage losses that were traced to a soil-borne, heat-resistant organism—*Bacillus thermoacidurans* (*coagulans*). The spoilage was particularly insidious because it was of the flat-sour type that did not cause swelling of the cans.

Tomato juice in cans heats so slowly that a conventional process adequate to destroy *Bacillus thermoacidurans* ruined the quality of the product. But it could be sterilized the HCF way without harm. To obviate need for an aseptic filling and closing machine, this acid product, after being flashed to 250-275F. (depending on the type of heat exchanger used), was cooled to about 200F. before filling into cans.

The closed cans were then given a short boiling-water cook to destroy any organisms present in them or picked up from the air during filling. This procedure was later modified to a hot fill followed by a 3 min. hold to destroy any recontamination.

A process equivalent to 0.7 min. at 250F. was found to destroy the heat-resistant organism. In contrast, a boiling water treatment for 211x 400 cans of approximately 140 min. was required to kill this organism in inoculated packs. Thus, the flash sterilization process, controlled the thermophilic spoilage and proved a time saver. It also conserved labor and was continuous.

Work on HCF vegetable purees has been carried on at intervals from 1936 to date. The product studied most frequently was baby food, which normally is packed in small cans requiring only short processes. As originally packed, the color and sometimes the flavor of the HCF processed baby foods were vastly superior to the conventional products.

However, the color of the green vegetables faded rapidly during room-temperature storage. For example, HCF-processed pea puree or green bean puree, when stored several months at room temperature, faded until they differed little in appearance from conventional baby foods.

Cream style corn can be greatly improved by HCF processing, particularly when large size cans are involved. Many experimental packs of both yellow and white cream style corn have been made. Experiments in 1955, involving special blending of the corn, successfully overcame some of the consistency problems encountered in earlier packs. Flavor and color of the product are very similar to those of the blended corn before processing. Furthermore, the bright color, crisp texture, and fresh flavor are stable for a year or more.

In a 1946 study, a variety of concentrated soups were processed by HCF and conventional methods. Taste tests showed a marked quality advantage for the HCF product, even after a year or more of storage.

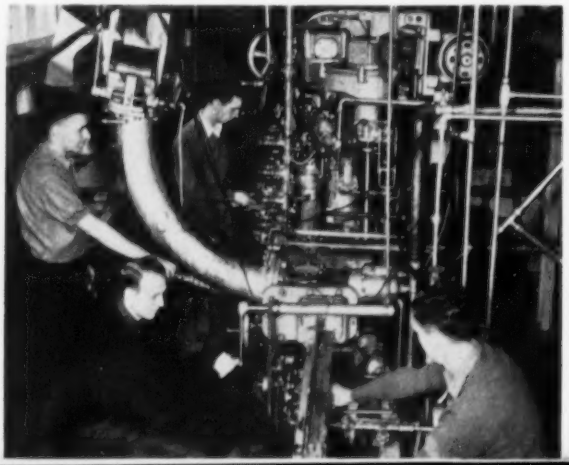
About the same time, a number of packs of puddings and custards were made. Some products with excellent color and flavor were produced. However, control of consistency was a major problem.

More recently, HCF processing of coffee cream was studied. By using a stabilizer and by homogenizing after sterilizing and partially cooling, it was found possible to prepare a product that would remain stable for 3 months at 98F. Deaeration of the cream before processing resulted in a marked cooked flavor immediately after processing. Without deaeration, the flavor of the product —immediately after processing—was preferred to fresh cream in coffee by a majority of a taste panel.

After about one week's storage, however, the choice was about equally divided. And after two weeks at 70F.,

3 Units That Have Played Roles

PFC **PRESSURE-FILLER-COOKER** unit employs spiral food-heating tube, can filler, and high-speed vacuum closer enclosed in steam chamber for continuous processing.



fresh coffee cream was preferred.

Following several week's storage, there was little choice between the aerated and deaerated HCF samples, but on longer storage, the deaerated samples usually were preferred. Minute amounts of metallic salts reduced the cooked flavor immediately after processing, but resulted in bitter flavors on storage.

In 1952, a small Martin Aseptic unit was installed at Canco's Maywood, Ill., laboratory (see photo) for further study of HCF processing. This unit has been used for evaluating the effects of the high temperature sterilization on container materials and for checking HCF packs.

The Martin unit, manufactured by James Dole Engineering Co., consists of equipment for sterilizing empty cans and covers, combined with an aseptic filling and closing machine. Intended to aseptically handle HCF-processed foods, it performs exactly the same function as the earlier Canco aseptic machines. However, since the Martin unit uses superheated steam at atmospheric pressure, it is much lighter and less expensive to build than the Canco machine that used steam at 1-to-40 psi. Also, the Martin machine can be easily converted from one can size to another.

Agitating Vacuum Improvements

In 1944, it was found that agitation during processing of vacuum packed vegetables containing an ounce or two of brine greatly increased the rate of heating.[6, 7, 10]

Three types of agitation were studied: (1) Continuous end-over-end, (2) continuous axial, and (3) intermittent axial rotation.

The first two of these rotations may be obtained in the batch type cooker used commercially for evaporated milk by placing the cans in the reel so that they will be agitated either end-over-end or about the cylindrical axis of the cans. Tests showed that rate of heat penetration is influenced only slightly by speed in the range of 10 to 40 rpm.

The third rotation—intermittent axial—is the type obtained in the conventional continuous horizontal pressure cooker of the agitating type. It results in slightly slower heating than continuous agitation, but much faster than conventional still processing of vacuum packed discrete-particle products.

For vacuum packed corn in 307x400 cans at a retort temperature of 250F., the calculated process time for continuous agitation is 12 min.; for intermittent agitation, 14 min.; and for a conventional still cook, 35 min.

Reduction in processing time by the agitating vacuum procedure provides important quality improvements. The better color of vacuum packed whole kernel corn is particularly impressive. The crisp texture and fine flavor of freshly cooked corn is also retained to a high degree. And the improved quality lasts the normal shelf-life of the product.

Previously, white corn had not been successfully vacuum packed, but the agitating method resulted in an attractive product. Improvements with both yellow and white corn are most evident in young, tender corn.

Other vegetables show less improvement than does corn. Diced beets and, to a lesser extent, carrots benefited with respect to color. Also, the seeds of agitating vacuum processed green beans remained green, while those of still processed green beans turned brown.

Besides the flavor, color, and texture benefits due to high-short processing there are certain nutritional gains. A marked advantage in thiamine retention and a slight increase in niacin retention occurs in HCF-processed cream style corn.[7, 11] A small advantage is gained in thiamine retention in agitating vacuum packed corn over conventionally processed vacuum packed corn.

It is hoped that this discussion will directly or indirectly result in further applications of high-temperature short-time processing and in higher quality canned foods.

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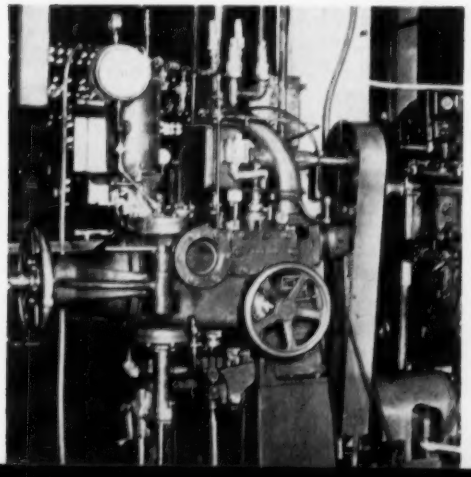
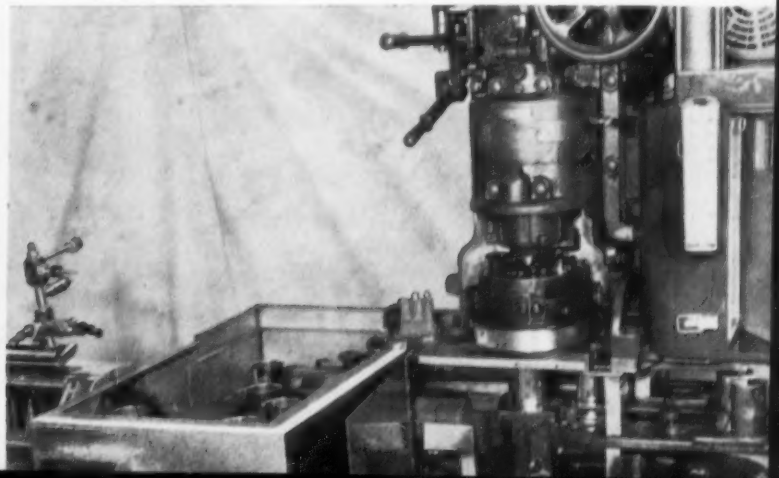
The above article is taken from the authors' paper presented at the 16th Annual Meeting of the Institute of Food Technologists, held in St. Louis.

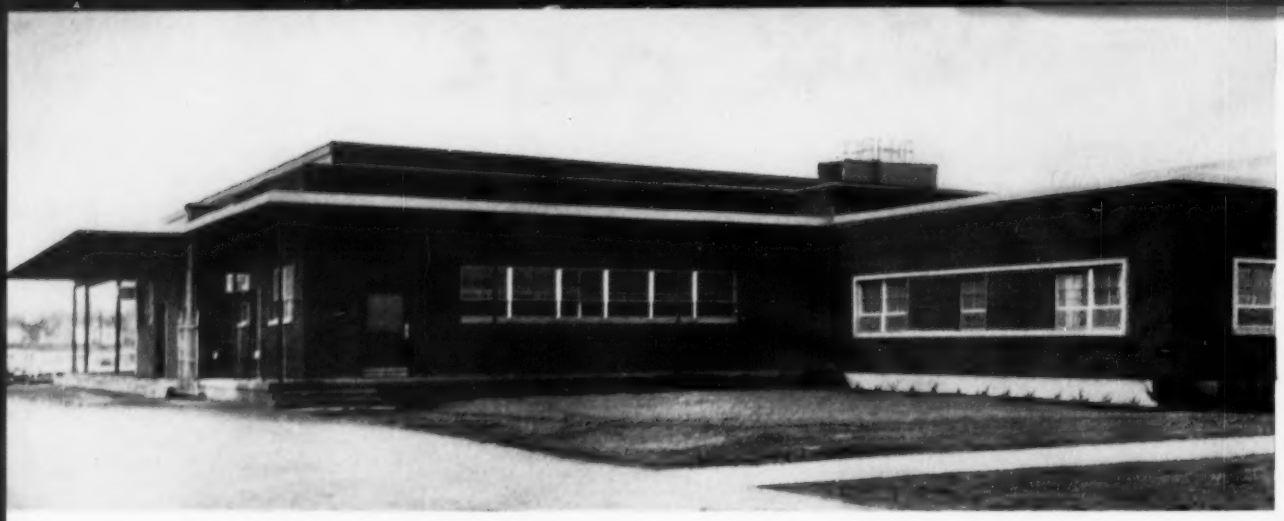
in the HTST Advances

SC **STERILIZING-CLOSING** machine packs discrete-particle foods by steps of heating, covering with sterile brine, sealing, holding.



HCF **HEAT, COOL, FILL** technique is exemplified by this Martin aseptic canning unit. It operates by sterilizing empty cans and covers, filling sterile fluid product, and closing aseptically.





New Plant Sets Engineering,

—with quick-freezing tunnel, completely palletized handling, and latest processing and packaging units . . . Layout eliminates all cross-traffic

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

IF YOU COULD build the ideal food plant, what would it be like?

That was the question Borden executives asked themselves three years ago following the decision to construct a new ice cream plant in Columbus, Ohio.

▶ Today they have the answer in their recently completed one-story, 53,000-sq.-ft. facility. The advanced features incorporated in it will interest every enterprising food plant operator.

In the planning, special consideration was given to elimination of five troubles — bottlenecks, cross-traffic, lost motion, duplication of effort, and also confusion—that have frequently plagued conventional plants.

As a result, the 48x100-ft. production area has been placed in the center of the building. In back of this is the mixing room with direct access to the receiving room, where raw materials arrive by tank trucks.

On the north side of the production area is the 115x144-ft. warehouse for storage of packaging materials and other supplies. And on the south are the fancy ice cream department, the 1,600 gph. hardening tunnel and low-temperature storage room, product assembly and packing rooms, shipping department, and truck loading docks.

With this layout there is no cross-traffic. Ingredients and supplies come in at rear of building and flow into the production area at right angles to each other.

Following processing and packaging, products move out the other side of this area toward their destination—the delivery trucks at loading docks on the south end of the building.

Advanced Materials Handling

In line with executive plans for extra efficiency and ease of effort, maximum use has been made of the latest materials handling methods and equipment.

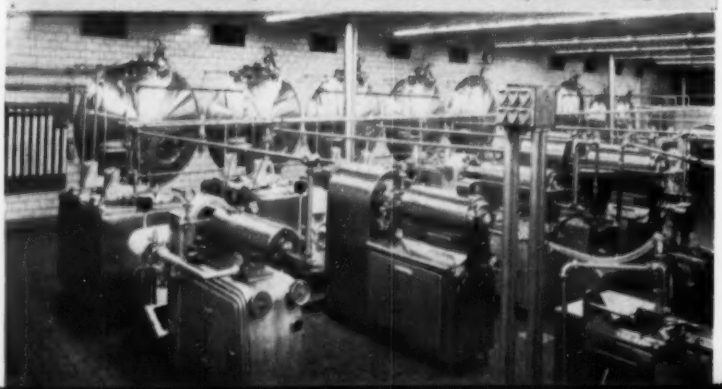
On reception, the milk products and sweeteners, are pumped to storage tanks—four for dairy products, two for liquid sugars.

For preparation of mixes, these products are metered from the tanks into one of the three pasteurizers. And even with minor ingredients, no manual lifting is involved. They are weighed into stainless drums. These are moved to a special dumping device that lifts and empties them into a chute above the weigh tank.

Following pasteurization, mixes are homogenized, cooled, and pumped to the eight storage tanks set in the north wall of the processing room (see photo below).

Movement of mixes from storage to freezer supply tanks is by compressed air. This enables the freezer operator to close valves on supply tanks without the possibility of fat

PRODUCTION DEPARTMENT (48x100 ft.) in center of building features straight-through product flow. Mix storage tanks in tile wall take up minimum of space. Utilities feed from under floor, thus eliminating unsightly pipes. Electrical outlets on stanchion serve portable units, such as slice-wrap machine (right).



LOCATED on 20-acre plot with ample space for future expansion, the brick faced, one-story modern steel and masonry building contains 53,000 sq. ft. of floor space.

Automation Pattern

churning due to continued operation of a pump. Also, when a storage tank is emptied all of the mix in the pipeline is moved to the freezer.

Palletized Cold Room

Supplies are either received on pallets, or transferred to them at the dock. Then fork-lift trucks move the loads into the warehouse, where they are stored until needed.

Bulk ice cream and stick novelties move from the production area on belt conveyors that pass through the refrigerated assembly room. Packaged ice cream from the freezing tunnel is conveyed to the same room. Here, the products are removed from the conveyors and stacked on 50x40-in. wooden pallets. When filled, these hold about 150 gal. of ice cream. Electric fork-trucks move them to the 81x100-ft. cold storage room.

Specially constructed metal racks in this room enable loaded pallets to be stacked three high, thus minimizing the usual waste of headspace.

For movement to branch distribution plants, loaded pallets are transferred by fork-trucks to a giant refrigerated trailer. For city delivery, however, products are assembled on additional pallets by a box man, who transfers desired products from the filled pallets to one on a walking-type fork-truck. Once the order is completed it is moved to the loading platform by an electric fork-truck.

Here, a special night load-out crew transfers it from the pallets to the delivery truck.

Engineering Advances

A number of noteworthy advances are engineered into the new structure.

The ice cream hardening room—insulated with 8-in. of corkboard—is an outstanding example. In the building of its roof, usual construction procedures were reversed. The concrete slab was installed first (forming the room's ceiling), then the corkboard was put down on top of it. Bonded roofing was applied over the cork.

In putting down the floor, sand fill—ranging from 12 in. to 6 ft.—was used. In it, 6-in. vitreous tiles were laid in rows 8-ft. apart. These lead from outside the building to the basement.

An unusual feature here, is extension of the tiles approximately 8 ft. up the outside wall of the hardening room. This provides a chimney effect and draws warm air from the basement which, in turn, gives up its heat to the fill and prevents freezing and possible heaving of the floor.

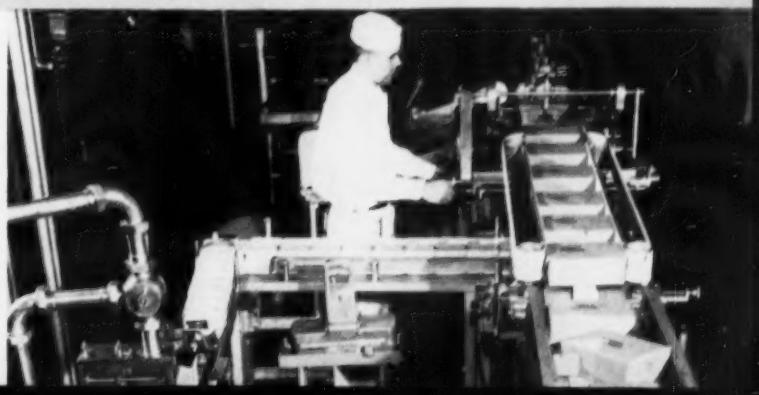
A 6-in. concrete base was laid on the sand fill. Then came 8-in. of corkboard and the 4-in. concrete wearing floor.

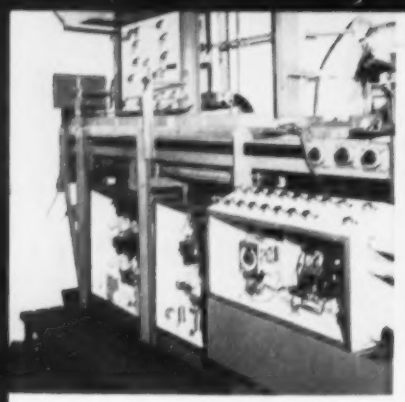
As a further protection against freezing and subsequent heaving of the floor of the freezing tunnel (tunnel operates at −30F.), electric heating cables were embedded in the fill. These are thermostatically controlled to maintain a +42F. temperature.

Refrigeration for the hardening room is supplied by two York Co. units installed in easily accessible compartments in the west end of it. Chilled air is fed from them through

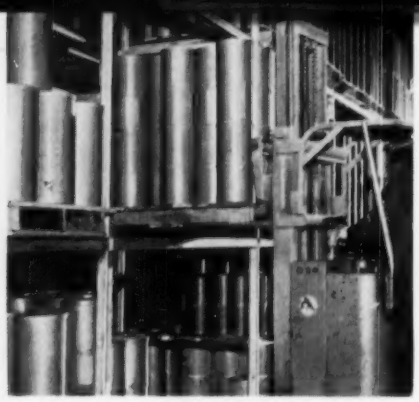
CLOSEUP OF SLICER (Anderson). It receives ice cream directly from continuous freezers and extrudes it into slice-size paper sleeves. These are boxed in quart units, and sent to freezing tunnel to harden.

AUTOMATIC BUNDLER (Hayssen) accumulates two ½-gal. packages as they are conveyed from Anderson filler (left), wraps and seals them in kraft paper. Gottscho coder (rear) imprints flavors on three sides of wrapper. Sealed packages are conveyed (foreground) to freezing tunnel.





FREEZING TUNNEL has capacity of 1,600 gph. Left photo: Loader and controls are in small room adjacent to processing room. Packages enter at right, are assembled in units of 8, then conveyed through opening (left) into carriers in tunnel. Right: Filled carriers move down top half of tunnel, then are lowered and return to unloading position (foreground). Here, frozen packages are pushed onto conveyor (left) that moves them to hardening room.



COMPLETELY PALLETIZED hardening room features 3-high stacking on special metal racks. Cans and packages are transferred from conveyors to pallets in refrigerated assembly room. For delivery, they go into trailer or onto route trucks.

ceiling ducts and discharged downward into all parts of the room through special diffusers. With no coils in this room, defrosting problems are eliminated. And the refrigeration units, being in separate compartments from the hardening room, are easily defrosted with hot ammonia gas.

Another pace-setting advance is the new freezing tunnel (FE Jan., p. 111) with a rated capacity of more than 1,600 gph. Unit was supplied by Freezing Equipment Sales Inc.

In addition to improving product quality (by quick freezing), the tunnel has greatly increased the plant's hardening capacity, and cut refrigeration requirements of the hardening room.

How Tunnel Operates

Gallon packages (comprising 8 pints or 2 half gallons), or cups, etc., in approximately the same size packages, are conveyed from fillers in the processing area to a small room that houses the tunnel loader.

Here, packages transfer to a second belt running at higher speeds than the infeed one. When they reach the end of this belt they are halted by stops on chains located on each side of it.

A counter, mounted above the belt, controls number of packages that enter the freezer. When eight pass it, a gate drops and holds back the line on the entering conveyor. Then the previously mentioned chains start up and move these packages into the freezing tunnel. When cycle is completed, chains stop and gate lifts, allowing more packages to move toward the tunnel.

The freezer comprises sliding carriers (each having six shelves that form compartments in which a group of 8 packages ride). These carriers are pushed through the 70-ft.-long tunnel by a powerful hydraulic ram. They are then lowered and moved back to the starting point by another ram.

As the compartments move through the unit (it takes 4 hr.), products are continuously exposed to blasts of −30F. air. Upon completion of a cycle, an arm moves across each shelf and pushes the row of frozen products onto a conveyor that carries the packages to the assembling room.

Carrier is raised the height of one shelf and the previously described loader fills the empty shelf with packages to be frozen. This emptying, filling, and raising operation is continued until the six shelves are loaded with unfrozen ice cream. Then compartment is pushed into top of tunnel and starts another cycle.

Products fill less than ¼ of the space in each compartment, thus enabling movement of a large volume of cold air through it. This also adds to versatility of the tunnel, since it permits handling of various size packages.

Central control panels for the tunnel are located in the loading room. Comprising a flow diagram of the freezer, they have lights that indicate action of its components, relays and timing mechanism, and pushbuttons for manual operation when desired.

An excellent example of the careful planning that went into design of the new plant is provision for expanding the freezing tunnel at any future time. Additional insulated space—now used as the frozen products assembling room—can be incorporated in the tunnel. Then the freezing unit can be extended, and its capacity increased approximately 50%.

Processing Equipment

In their search for *extra efficiency* and *excellence of quality*, Borden executives left no stone unturned. This is notably demonstrated in the case of processing equipment. Here, the most advanced units are installed.

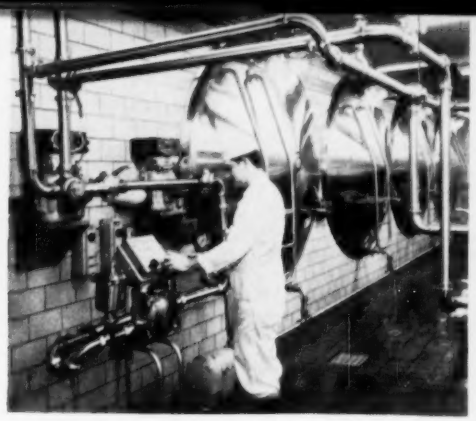
Outstanding examples:

1. Anderson half-gallon, pint, and slice-wrap machines.
2. Hayssen accumulator and bundler.
3. Gram stick-novelty unit (FE Mar. '53, p. 64).
4. Eight continuous ice cream freezers with total hourly capacity of 2,600 gal.

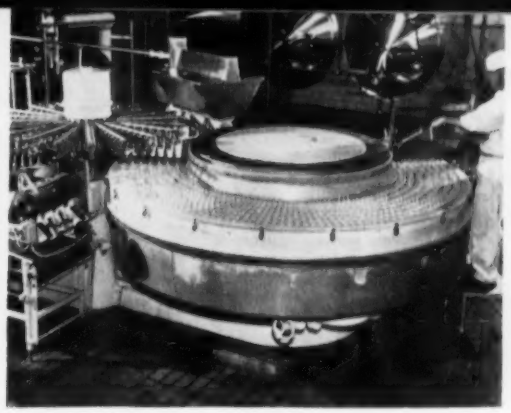
The half-gallon machine has a capacity of 1,000 gph. It receives ice cream directly from continuous freezers, fills it into cartons, and discharges them to a belt feeding the bundling machine.

Here, two containers are assembled automatically and wrapped with kraft paper, then sealed into a compact package. This is imprinted on three sides with company name, and flavor of ice cream, and discharged to a belt supplying the freezing tunnel.

The slice-wrap machine receives



PUSHBUTTON operation has replaced manual can dumping in mixing. Here, operator sets meter for dairy product, which will be automatically measured as it flows from one of the storage tanks at right. Liquid sweeteners from tanks in an adjoining room are delivered through two meters above.



GRAM MACHINE produces stick novelties at high speed. In operation, product from continuous freezers is fed from hopper (rear) into cavities of revolving ring immersed in refrigerated brine. As ring moves clockwise, sticks are automatically inserted (right). Frozen novelties are lifted from molds, coated and bagged (left).

ice cream from continuous freezers and turns out individual portions, which are packed in quart containers. These are likewise bundled into gallon packages and sent to the freezing tunnel. This unit eliminates the conventional "brick" mold in which layers of soft ice cream are placed, then hardened, and removed to be machine-sliced, wrapped, and packaged.

The Gram machine, which operates like a merry-go-round, has 169 rows of seven pockets each rotating in a tank of brine. Measured quantities of ice cream from continuous freezers are filled into the pockets at the start of the cycle. Then, when product is partially frozen, sticks are automatically inserted.

Farther along, the molds transfer from freezing brine into hot brine that softens outside edge of ice cream. Then stainless grippers mounted on arms of another merry-go-round move down over the sticks, grasp them, and lift the bars from the mold. As arms rotate farther, they again move down and dip the bars in melted chocolate, then raise and allow excess to drain back into the tank.

Finally, the grippers release the sticks, permitting bars to drop into opened bags in the automatic bagger, then fall onto a conveyor and are manually boxed-in-2-doz. units. These are bundled into 12-doz. packages, which are conveyed to the assembly room to be palletized.

Gram unit has two interchangeable mold-containing rings, each with 1,183 pockets. However, the molds are of different sizes and shapes —one being used for chocolate coated novelties, and the other for Popsicles.

Additional Features

Adjoining the processing area are two more of the plant's improved features. One is the chocolate melting room, in which coating is readied for use in the Gram machine.

Here, the product is stored (at approximately 100F.) in 50-gal. drums for several days prior to its use. As a result, an ample supply of coating at the correct dipping temperature is always available.

Other advanced facility is the fancy ice cream department—a 20x58-ft. room facing the hardening tunnel. Room is divided into three sections, each with its own sink, stainless steel work table, and ice cream cabinet. Also in it are a batch ice cream freezer, and storage space for the plant's 2,000 fancy molds, 150 special stencils, and 100 center brick molds. Insulated passing doors lead from the room into the hardening tunnel.

Ventilating System

Processing rooms and offices are continuously supplied with fresh air by blowers installed in penthouses on the plant roof. These draw the air through filters and, in winter, heat it by passing it over steam coils. In summer, air for the offices passes over cooling coils.

Ventilators equipped with exhaust fans remove air from the processing rooms. This is especially important in the mixing room, since it prevents accumulating of steam and hot vapors which cause rusting of equipment, peeling of paint, and often mildew. These units are capable of changing the air each 3-5 min.

Capacity of the infeed blowers is somewhat in excess of the exhaust fans. This produces a slight pressure within the building that causes air to move outward whenever a door or window is opened. Thus prevented is entrance of dust and unfiltered air from the outside.

Utilities From Below

Compressor and boiler rooms are in the basement which is under the processing room. From here, tunnels carry utility lines to points of usage in the plant above, thus completely eliminating unsightly pipes, etc., that are usually dropped from the ceiling. These include lines for ammonia, brine, steam, water, and electricity. Another plus here, is ease of accessibility for repairs, changes, etc.

Refrigeration for the freezers, tunnel, and hardening room is provided by recirculation of liquid ammonia. Compressors employed include: seven high-speed V-type units—four low-stage and three high-stage—and one 10x10 vertical compressor.

Other equipment in the basement includes:

Three automatic gas-fired package boilers that generate low-pressure steam for processing and heating.

Zeolite water softeners.

A 1,085-gal. hot-water storage tank.

Recirculating brine cooler, which supplies the Gram stick-novelty machine.

NERVE CENTER of this efficient multi-item handling system is the RR-type switching station, where seven live-storage lines (entering at right) cross eight take-away conveyors (background). Operator is seen adjusting one of deflector devices that enable him to shunt any assortment of cases from one conveying system to another. Thus he makes up shipping orders right on the line. Three take-away conveyors feed automatic palletizers that form unit loads for long-distance hauls. Others chute mixed lots directly to local-delivery platform.

Shipping Sped, Floor-Storage Cut By Flexible Case-Feeding System

"Live-storage" setup puts routing of mixed-lot orders and palletized loads on "run-through" basis. And it's all controlled from a unique dispatch station featuring RR-type switches and electric-eye counters

LEONARD TRAUBERMAN
Assistant Editor, "Food Engineering"

TO CHANNEL a modern plant's complex multi-item case flow—so that its several streams carry directly and most efficiently from production to outbound carriers—calls for engineering ingenuity of the highest order.

However, the processor who persists in battling this materials-handling problem down to its final solution will find himself amply repaid by three very significant benefits—

1. His loading of carriers will be accelerated.

2. He'll have the advantage of "live" storage—minimizing the old floor-stacking of cases.

3. His inventory control will be notably simplified.

Now demonstrating all these values—with a top-efficient coordinated conveying-palletizing system—is the Philadelphia brewer, C. Schmidt & Sons, Inc. Here, a highly flexible dispatching arrangement directs cases either to manual truck-loading docks in the main building, or to three automatic palletizers in an adjacent structure. Latter units discharge to vertical lifts that take palletized loads down to a shipping platform, then return with pallet loads of empty bottles.

Nerve center of this system is a bank of railroad-type switches operated from a control panel at the dispatch station. All orders are made up at this point by one man, who can shunt any number of cases from any of seven product lines to shipping docks in either building.

This flexibility enables the company to take full advantage of palletized handling—of prime importance because some 67% of current production goes into highway trailers or rail cars as unit loads. Yet, the system also permits efficient manual loading of mixed orders for local delivery.

Another advantage is live storage, since conveyor lines can accommodate most of the production on a "run-through" basis. Cases are taken off the line only when output exceeds shipments plus live-storage capacity. In that event, excess cartons are hand-palletized and trucked to nearby load-unload stations.

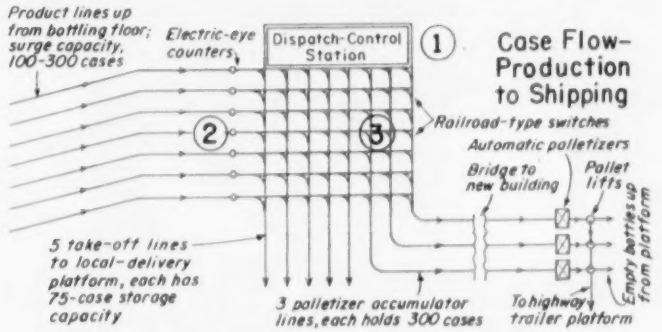
On the other hand, this procedure is reversed when shipments temporarily exceed production. Cases are then put back on the lines as required to keep them running at full capacity. Actually, a three-day surge supply is maintained. This permits uninterrupted loading of large orders.

In addition to serving as live storage for local-delivery loads, the product lines act as accumulators for the palletizers. Full-pallet switches indicate how many cases (in terms of pallet loads) are in this reserve at any moment.

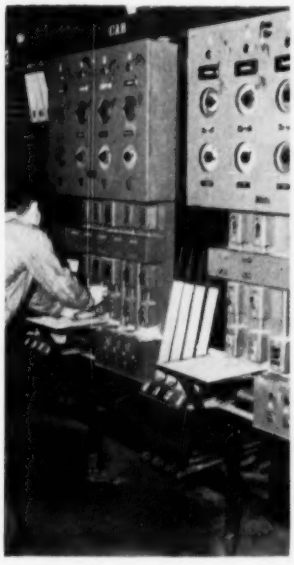
Thus, the dispatcher can choose to make up loads for local delivery or increase the case reserve for palletizers. This system was designed by J. L. Layton, Schmidt's chief industrial engineer, in cooperation with Lamson Corp., Syracuse, N. Y.

For a closer look at these opera-

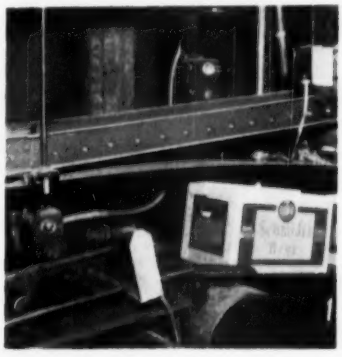
How Cases Are Metered to Shipping Docks



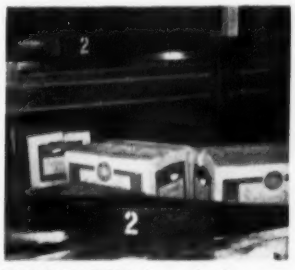
SCHEMATIC shows flexible routing of cases from production area to shipping docks, indicates live-storage capacity of system. (Numbers on diagram key to closeup photographs below.



1 **CONTROL PANEL** at switch station houses the automatic counters (top), which can be set to deliver any number of cases from any product line. With deflectors adjusted, operator merely presses a button to release the cases.



2 **"ELECTRIC EYE"** on remote metering belt counts off pre-set number of cases, then shuts down line.



3 **DEFLECTOR** channels the cases from product line to desired take-away conveyor.

tions, we will follow the various case flows through the bottle house and into outbound carriers.

Cases Travel Non-Stop

Packaging takes place on the first floor of the bottle house, from which the seven product lines originate. Six of them handle cased products in conventional sizes (12, 16, and 32 oz.), whereas the seventh line is used for miscellaneous items.

As shown in the accompanying diagram, all lines rise to the second floor and converge on the switching station. Here, by means of deflectors, they cross a series of eight lines. In effect, seven conveyors are converted into eight at this point.

Five of the new lines deflect cases into chutes that lead to gravity conveyors feeding five docks on the local-delivery platform. The other three lines carry cases across a bridge to the building that houses the palletizers and vertical lifts.

Here's how this switching station operates:

Shipping orders are quickly invoiced and sent to the loading platforms. From there, they are transmitted to the dispatch station by intercom. The dispatcher then processes the order by setting automatic counters on the control panel, and adjusting deflectors on specific product lines. Positioning these deflectors is the only manual operation required before the system is ready to deliver a composite flow of cases to a particular shipping dock.

Number of cases successively fed from each product line is regulated by counter settings, the actual counting being done by electric-eye mechanisms on each live-storage conveyor. After the required number of cases of a particular item has been delivered, the electric eye shuts that conveyor down, and operator starts the next one.

Thus, any assortment of items can be sent to the shipping docks. And having the total count of each product that is delivered greatly simplifies inventory control.

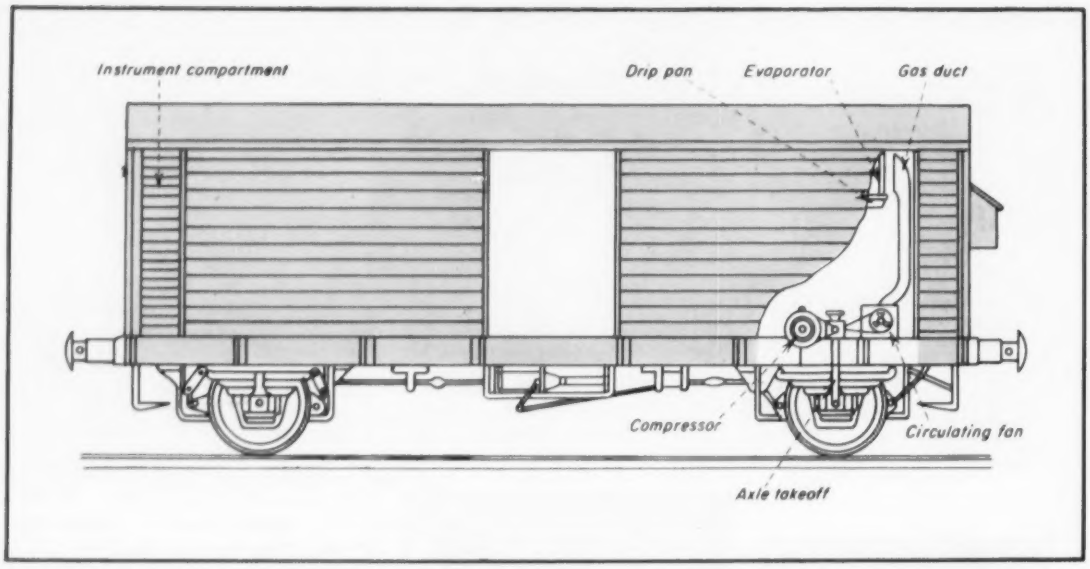
Palletizer-Lift Operation

The three remaining conveyors feed the palletizers which handle 20-25 cases per minute. Loading patterns are selected at the dispatch station and transferred electronically to the palletizer's "memory" cartridge, which programs the stacking.

Palletized loads discharge to short roller conveyors that feed vertical lifts on the second floor. Latter take loads down to the shipping platform, where they move out on slat conveyors and are picked up for immediate trailer-loading, or go to storage.

Cases of empty bottles go up to the second floor on the lift's return trip and discharge to holding conveyors. Empties are either stored or depalletized and sent to washers in the bottle house.

Action of a palletizer is interlocked with that of its corresponding lift, whose feed and discharge conveyors each have a three-pallet-load holding capacity. Thus, palletizing stops automatically when three loads have accumulated on the lift's feed conveyor. Moreover, a lift will not accept a load for travel in either direction if its respective holding conveyor is full.



RIPENING IN TRANSIT is accomplished in special insulated railway cars lined with thin metal sheets and having tight-fitting doors to hermetically seal treating space. Refrigeration compressor and gas-circulating unit are mounted on floor over an axle and driven by it. Treating gas is fed from cylinders, distributed through sparge lines inside car.

Speeds Fruit, Vegetable Ripening

Special method employs air-nitrogen atmosphere to hasten biological processes . . . Technique may also be varied to keep produce "just right" in storage. And there's an effective fumigation application, too

DIEGO STRANIERO

McGraw-Hill World News, Rome

PRODUCERS of fresh fruits and vegetables in Italy and France are now using an improved technique for quick ripening, extending storage, and fumigating their products. This new method—

▶ 1. Enables delivery of ripe produce long before the field-ripened products are available.

▶ 2. Makes best use of the last part of the crop.

▶ 3. Destroys insects with a minimum of toxic gases and without use of vacuum.

▶ 4. Operates at approximately ¼th the cost of other systems.

The technique makes use of biological processes which, as they occur in fruits and vegetables, consume oxygen. They are regulated by controlling the amount of oxygen supplied to the products.

Employed are: (1) a tightly closed, insulated compartment or warehouse for treating the fruits and vegetables; (2) automatically controlled gas-mixing and CO_2 absorbing machines; (3) refrigerating and ventilating devices for maintaining a uniform temperature and humidity in the compartment; (4) electric heating apparatus for raising temperature to optimum level when treatments begin, and (5) suitable gas-distributing facilities.

Compartments are equipped with instruments for controlling the dosing, and for purifying the gases during the operation.

Three-Function System

The technique was originally developed solely for storage of fresh fruits and vegetables. But during the experimental period, it was found that variations could be made for speeding up ripening and also for fumigating product.

As a result, a single plant was designed that, with different gas mixtures, would perform the following operations:

RIPENING: Gases used for this operation are patented mixtures of oxygen and nitrogen that speed up, three- or four-fold, the biochemical reactions in the products. Temperature is maintained at approximately 65-70F.

In 2-5 days, a state of ripeness and color is attained that would take up to 2 months under natural conditions.

Storage: Here, oxygen in the entering gas is replaced with nitrogen. Also, CO_2 and moisture are removed from the treating compartment's atmosphere. A temperature of 60-65F. is usually satisfactory. However, when products are to be stored for an extended period, a limited amount of refrigeration is generally employed.

Change in the oxygen-nitrogen

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

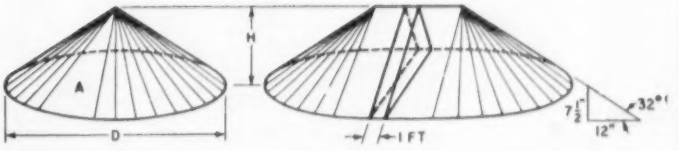
How to Determine Space Needs for Rock Salt Storage

Today, salt-using companies often have the problem of determining how much area and volume are needed to store a given amount of rock salt. To help the companies faced with this situation, International has developed a system for determining the exact floor space (or plant area) needed for any tonnage of salt. In addition, it is possible with this system to select the shape of salt pile best suited to individual plant layouts.

Principles of salt storage. International's system is based on two known facts: first, one cubic foot of rock salt (loosely poured and medium-packed) contains a constant average of 72 lbs. of salt. And, second, every conical pile formed by pouring rock salt from a fixed overhead point assumes the same shape.

Referring to the diagram, you will note that this shape is a perfectly conical one, with an angle of repose of 32° from the horizontal. In other words, for every 12-inch horizontal run, there is a 7½-inch rise. With these basic principles, therefore, it is possible to determine just how large a pile will be formed by any tonnage of rock salt.

Tables give complete area and volume data. For the convenience of salt-using companies, International has prepared a comprehensive set of tables with all the storage-space data for amounts of salt ranging from three to 23,000 tons. With these tables, for example, you can quickly find exactly the amount of space needed to store 3,000 tons of rock salt. (The answer is a single, conical pile 100 ft. in diameter at the base, and 31 ft. high.)



Diagrams of two basic rock-salt-storage piles. Conical at left, windrow at right. Note 32° bevel, which applies to both types.

In many plants, however, it is not possible to store salt in one large, conical pile. Instead, it must be stored in a lower, longer, windrow-shaped pile. In this case, International's computations on storage-space requirements apply equally well. The data in the tables permit you to select the height or length of windrow pile best suited to your plant needs.

Again taking the example of 3,000 tons of salt: It can be poured from a portable conveyor belt into a pile 65 ft. wide at the base, 20 ft. high, and 100 ft. along the crest. Or, if such a pile doesn't suit your plant needs, the same tonnage can be stored in a pile 75 ft. wide at the base, 23 ft. high, and 55 ft. along the crest.

Easy way to check tonnage of any salt pile. A problem often encountered by salt-using companies is how to determine the amount of salt in a given storage pile. Here again, International's complete tables will quickly give the answer. Because each measurement in a symmetrical salt pile bears a fixed relation to every other, it's possible to find every measurement when only one is known. Thus, a conical pile 16 ft. high will contain 368 tons of salt.

There is still another way in which International's salt-storage tables are helpful. If you want to cover an outdoor pile with tarpaulin or tar paper, you can easily find the surface area of the pile. For example: the surface area of a conical pile 45 ft. in diameter is 1,870 sq. ft. These comprehensive tables are included in a booklet, "Brine for Today's Industry," which will be sent to you at your request. Simply contact International.

DATA GIVEN IN INTERNATIONAL'S SALT-STORAGE TABLES

Given any amount of rock salt, from three to 23,000 tons, you can find these storage-pile measurements at a glance:

1. **Height.**
2. **Base Diameter.**
3. **Base Area.**
4. **Surface Area.**
5. **Volume.**

The same data apply to windrow segments. And because each measurement bears a fixed relation to every other, you can find every windrow measurement if you know just one.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on space needs for rock salt storage—just contact your nearest International sales office.

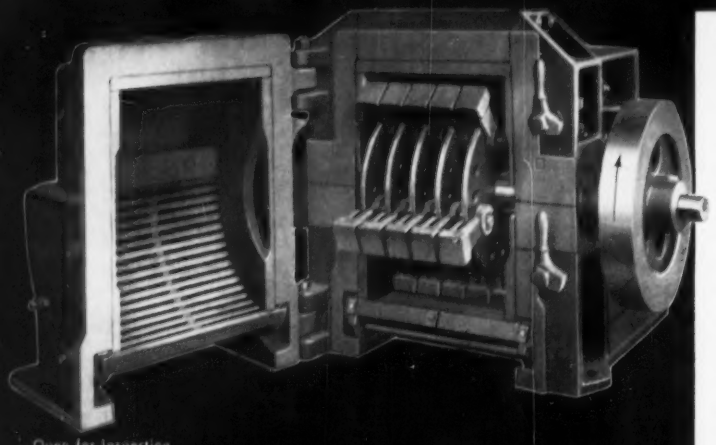
International Salt Co., Scranton, Pa.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

"Two Minutes Daily Solved Our Tough Grinding Problem"

Says W. Carleton Merrill, *Manager*, Protein Division,
Jas. F. Morse Co., Boston, Mass.



Open for Inspection

Sturtevant Swing-Sledge Mills (illustrated) crush moderately hard materials at rates up to 70 tph; Hinged-Hammer Pulverizers crush softer materials at rates up to 30 tph. Reductions on both mills up to 20 mesh. **Request Sturtevant Bulletin No. 084.**

Engineered to Save Downtime, Keep Production on Schedule

One man can swing open a Sturtevant Swing-Sledge Mill or Hinged-Hammer Pulverizer in less than one minute — for inspection, clean-out or maintenance — thanks to Sturtevant's unique "Open-Door" design.

Costly downtime is cut to a minimum, production kept on schedule — **even when the unexpected happens.** Little wonder that users say: "Because of their rugged construction and "One Man, One Minute" accessibility, Sturtevant machines give us **lower** operating costs over **more** years."

STURTEVANT "OPEN-DOOR" DESIGN MAKES MAINTENANCE A CINCH, INSURES OPERATING EFFICIENCY

"We wanted 100 per cent discharge area from our grates," Merrill of the Morse Co. reports. "But cake tankage — broken bone pieces and trimmings of meat and fat — can clog up any grate if all the grease isn't pressed out. In two minutes at the end of the day we can open our Sturtevant Swing-Sledge Mill for inspection, clean it if necessary, and button it up for the next day's production."

If you grind anything as unpredictable as cakes of dry rendered tankage — like the Morse Company does — or desire low-downtime for clean-outs and emergency maintenance, you'll want the "One Man, One Minute" accessibility plus rugged construction that has been engineered into Sturtevant crushing and grinding machinery.

Write today describing your problem. Please include information on materials, process and desired capacity.

Address: Sturtevant Mill Co.,
106 Clayton Street, Boston 22, Mass.

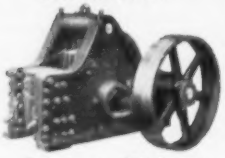
STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

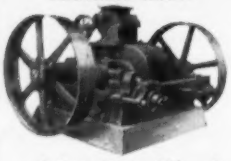
CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

JAW CRUSHERS



Reduce coarse (5 in. largest model) to fine (⅛ in.) smallest model. Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smaller sizes operate on double cam principle — crush twice per energy unit. *Request Bulletin No. 062.*

CRUSHING ROLLS



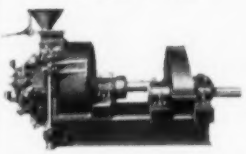
Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types—Balanced Rolls have automatic adjustment in operation; Recommended for 3 to 1 reduction. *Request Bulletin No. 065.*

ALL STURTEVANT MACHINES ARE DESIGNED TO OPERATE ADVANTAGEOUSLY IN "UNITS"

ROTARY FINE CRUSHERS

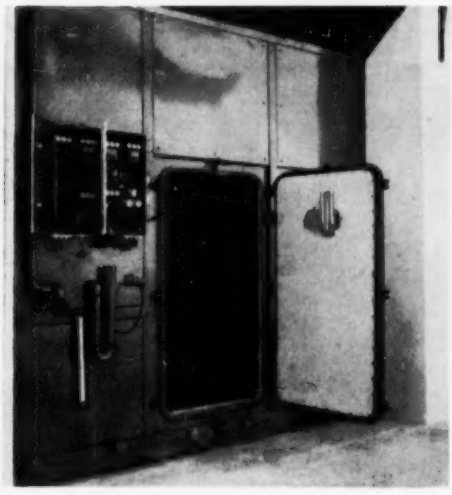
Five models reduce 3 to 8 in. soft to moderately hard materials down to ¼ to 1¼ in. sizes. Capacities up to 30 tph. No clogging; even product flow. Smallest model has 6 x 18 in. hopper opening, largest has 10 x 30 in. *Write for Bulletin No. 063.*

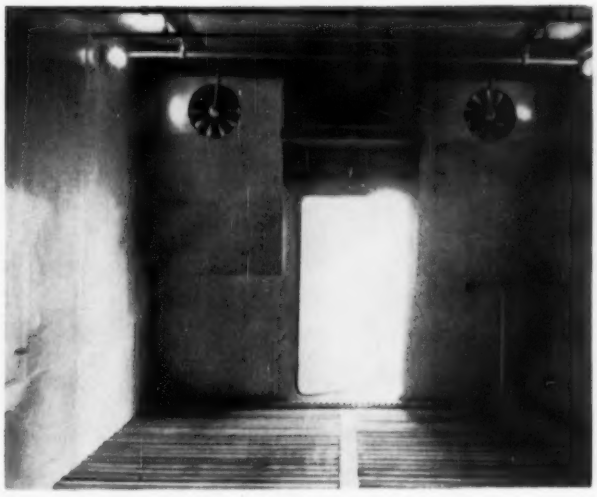
RING ROLL MILLS



Reduce hard or soft 1½ in. and smaller sized material to from 6 to 200 mesh. Grind only — no screens. Capacities of 3 models range up to 18 tph, depending on model, material. Ring diameters and faces 24 x 7 in.; 45 x 8 in.; 44 x 14 in. *Request Bulletin No. 079.*

← For more data, circle this page number on card at back



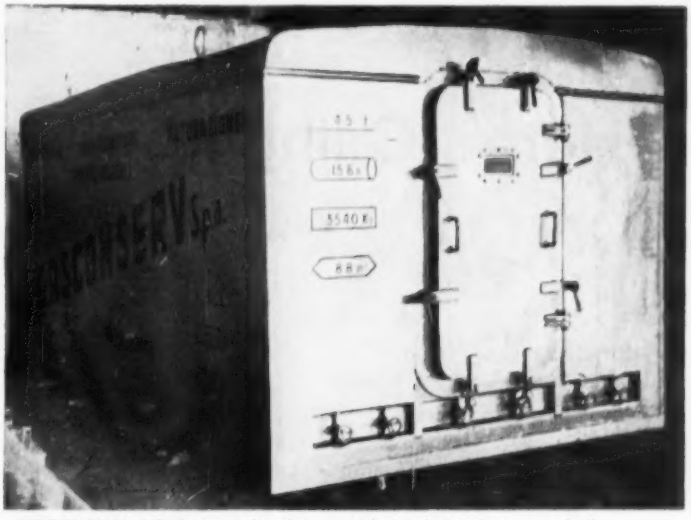


TREATING CELL has gasketed door that is closed with clamps to prevent gas leaks. Instrument (panel left) control oxygen-nitrogen ratio of dosing gas, its CO_2 content, temperature and humidity. Manometer (below) indicates pressure. Interior (right photo) is lined with thin iron plates, has fans to circulate gas. Perforated pipe at floor introduces treating gas.

ratio of the storage atmosphere simply slows down the biological processes in the produce. When the atmosphere is returned to normal conditions, the processes resume their original functions and normal ripening proceeds.

Fumigation: For this operation, an artificial atmosphere that stimulates and speeds the respiratory activity of the insects, and that contains a small quantity of methyl bromide is used. Physical conditions such as temperature and humidity are varied also.

Under these conditions, it is claimed that about 1/7th the quantity of toxic gas gives results comparable to the conventional vacuum process.



PORTABLE CELL is made of iron with insulation between shells.

Several Size Compartments

Of the units now in operation, many employ compartments made of iron. Inside lining is of thin plates carefully soldered to make the interior air tight. Doors and other openings are provided with special gaskets and closing clamps.

Stationary compartments accommodate from 7 to 13 tons. Portable ones hold 3 tons or more.

For rail cars, either wood or iron boxes with capacities of 1,300-1,400 cu. ft. are used. Boxes are lined with thin iron plates, carefully soldered together and coated with anti-rust paint. Insulation is installed between box and inner liner.

Refrigeration unit and centrifugal aspirator are both driven by the car axle while in transit. However, they are also equipped with auxiliary motors to enable operation when the car is on a siding.

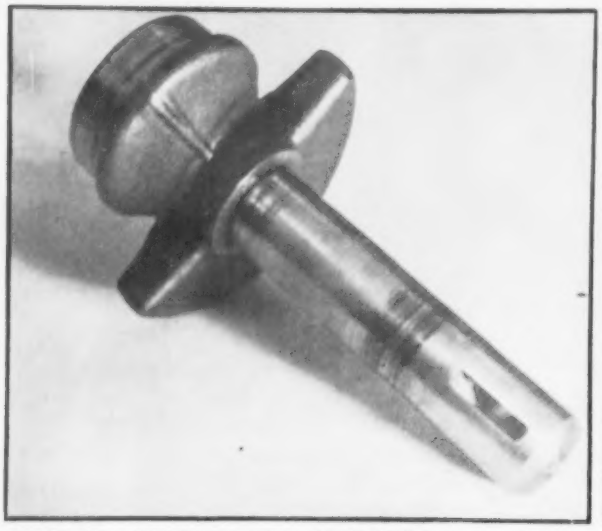
A duct in the car floor—connected at one end with the blower and discharging at the other end through the gas absorption unit "purifier" and cooling or heating coils—enables continuous circulation around products in the car.

For introduction of the particular gas mixture required, two sparge pipes are installed at opposite sides of the car. These are connected with a header in the equipment compartment of the car. The header, in turn, is connected with the drum of gas by rubber hoses.

In operation, the car is loaded with fruits or vegetables, in either crates or trays. Next, all openings are closed and tightly fastened. Then the required quantity of gas is injected from the drums and the blower is started. Control equipment then takes over and the desired treatment proceeds.

Equipment is made by Gasconserv Co., Piazza S. Babila, No. 5, Milan, Italy. —*End*

How Poor Lubrication



LACK OF ADEQUATE FILM STRENGTH in an oil causes metal-to-metal contact. Thus, this crankshaft was scored.

CARBON BUILDUP is another problem. Here it restricts passageway in cooling system cuts compressor capacity.

Here's Oiling Routine That Assures

Good maintenance of your unit begins with proper lubrication and ends with high efficiency and low operating costs

R. A. BUKOWSKI
Compressed Air & Gas Institute, Cleveland

PERIODIC LUBING is vitally important in the maintenance of your air compressor.

For this servicing, a good grade of compressor oil is generally satisfactory. Such oils are usually naphthenic in base, thus work to deter carbon and gummy deposits.

They should have the following characteristics:

1. **Wetting Ability:** A property that enables them to wet metal surfaces (in preference to water), thereby giving them resistance to the washing action of condensation from the compression cycle.

2. **High Strength** to resist rupture of their very thin films between lubricated parts, and consequently to minimize metal contacts and wear.

3. **Correct Viscosity** at operating temperatures. This, in combination with wetting ability, enables the oil to distribute rapidly and completely over working surfaces. It permits feeding of minimum quantities of oil, thus eliminates "oil pumping."

4. **High Chemical Stability** for strong resistance to oxidation, with minimal formation of gum and carbon deposits. Moreover, any carbon that does form should be of the soft, fluffy type that does not readily adhere to metal surfaces.

5. **High Flash Point** to keep down flammable vapors.

An accompanying chart gives actual specs on characteristics of proper oils. If your compressor is to operate in a damp, humid location, you may want to add a rust inhibitor to your crankcase oil.

Proper Oil Is Essential

When an oil lacking in the above qualities is used, many maintenance problems will arise. Most troublesome of these are:

1. Carbon build-up.
2. Mechanical friction.
3. Oil pumping.
4. Oil leakage.

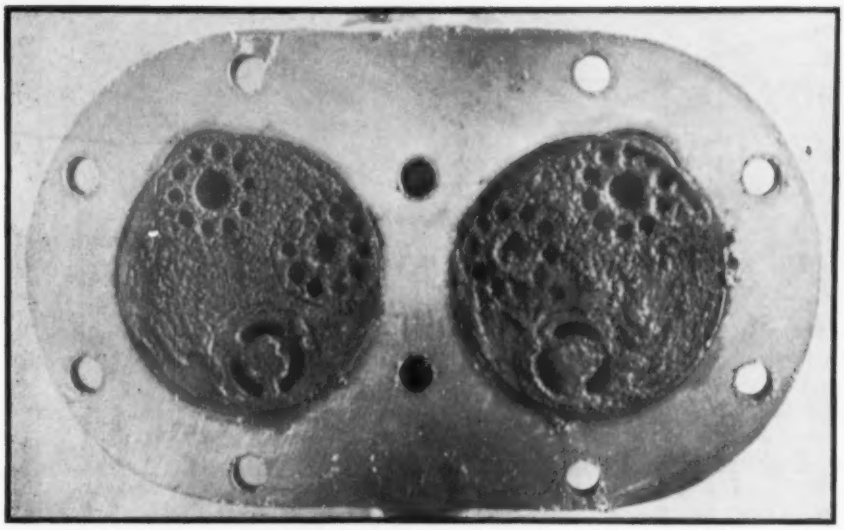
Carbon build-up occurs when the oils break down chemically at high operating temperatures caused by improper discharge valve action. Failure of these valves to seat allows hot discharge gases to re-enter the cylinder on the intake stroke, thus preheating the air and reducing efficiency.

Carbon thus produced will tend to restrict air flow in the cooling passages. And the gum and carbon from the heads are carried to the intercoolers in the pump cycle (see photos). Here they drop out and form a sludge, which is then baked by the hot air between stages of compression. This, of course, means still higher operating temperatures.

In this light we see why it is advisable to replace intercoolers and aftercoolers if a major overhaul becomes necessary. Recommendations for carbon removal are vague. Some compressor manufacturers say once every 600 hr., others say every month.

Mechanical efficiency is greatly

Ups Maintenance Cost



THESE VALVES, too, are victims—failing to function properly because of carbon buildup. Cause: Use of oil that breaks down chemically at high operating temperatures.

Proper Compressor Performance

reduced with improper lubrication. Metal-to-metal contact parts demand an ever constant film. Oils that don't have the proper wetting ability and don't resist the washing action of water are poor choices. Common sense tells you that if two metal parts are allowed to run on one another without lubrication, they will not run as smoothly and efficiently as when they have been properly lubricated.

But no lubricant will do its job if proper internal maintenance is lacking. On overhauling a pump, care should be taken to make sure that all lubricating passages are open. Since most compressor lubricating systems in the ½ to 20 hp. range are of the splash type, lubrication of a vital part may depend on a simple oil hole. And if that hole is closed, no oil can enter the passage. One of our photos shows the crankshaft taken from a single-stage, single-cylinder pump that had poor lubrication.

Oil pumping arises from improper lubrication, and it usually occurs with the use of an inferior grade of oil. But worn or stuck piston rings will also bring about this condition. On the other hand, worn rings don't really appreciably affect the actual air-pumping efficiency.

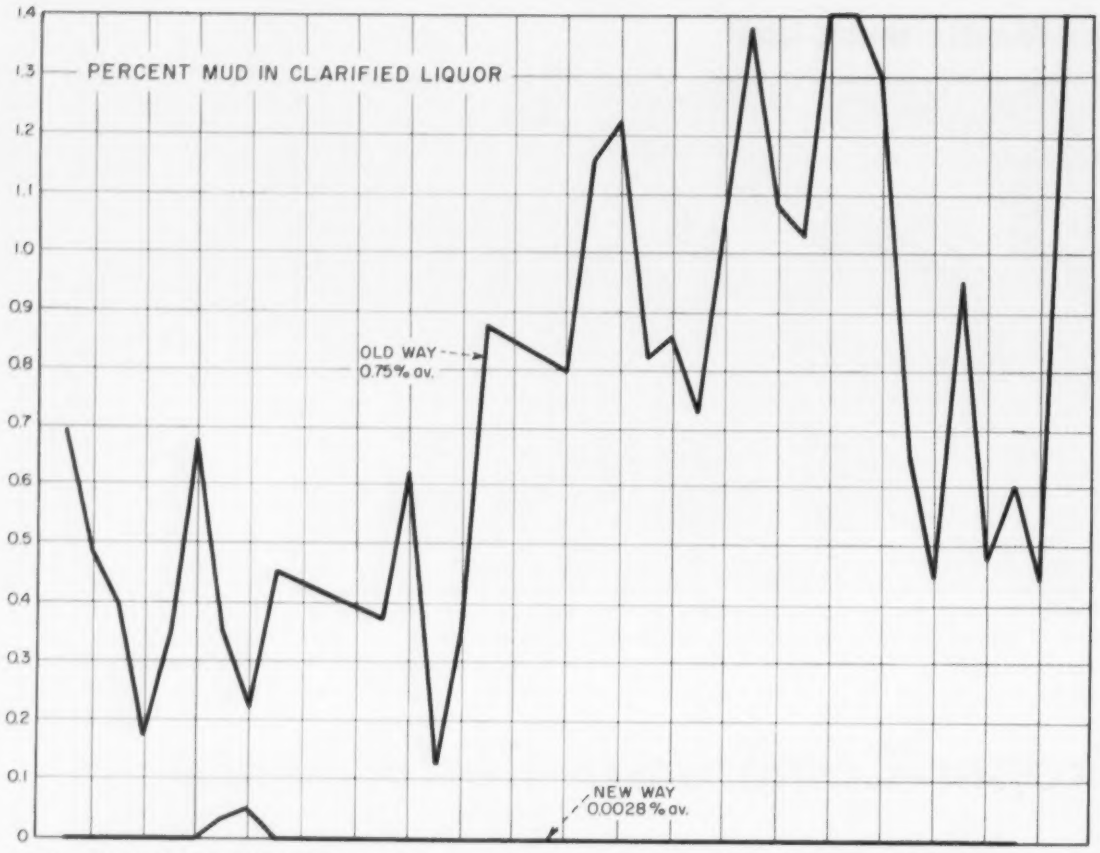
Leakage is a somewhat illusive aspect of lubrication maintenance. Spots where it can occur—base, end cover, and side-plate gaskets—should be checked frequently. If gaskets are still intact, shellac both sides and replace. If torn, get new ones.

As a test of compressor efficiency, it's advisable to check pumping time of the new compressor between a certain pressure differential. This record can be kept for further reference. If, in the future, you suspect that you are not getting as much from your equipment as you should, it is a simple matter to repeat your check of this pumping time over the same pressure range.

If there is a great difference, check your lubrication program first. Perhaps all you need to remedy the situation is the correct oil.

Oil Requirements Differ With Operating Temperatures

Ambient or Room Temp °F	Viscosity at 100°F S.S.U.	Flash Point °F (Min)	Pour Point °F (Max)	Carbon Residue % (Max)	Preferred Base
55 to 120	490 to 600	430	+20	0.15	Naphthenic
32 to 55	290 to 350	390	+5	0.10	Naphthenic
0 to 32	160 to 230	350	-10	0.05	Naphthenic
Above 120 or below 0	Consult factory giving details of installation and operation				



SERIES OF REGULAR READINGS over 5-week span show striking reduction of "mud" elements in clarified liquor. Improved defecation did it.

4-Way Sugar Refining Improvement

- Techniques Advanced
- Color Gaging Sharpened
- QC Mechanized
- Process Further Automated

HAROLD RAPP
Assistant Editor, "Food Engineering"

YOUR PROCESSING advances pay off the biggest when you can tune them most sharply to the industry trends.

It's that kind of tuning that's now spelling notable dividends for Refined Syrups & Sugars, Inc., of Yonkers, N. Y.

As for the trend, manufacturers' use of sugar has zoomed from 42 to 50% just since 1950, and liquid sugar output has doubled. Chiming in with this, RS&S launched a comprehensive $5,000,000 expansion and improvement program.

It's now approaching the half-way mark in its expenditures—and it points to these four outstanding strides that already demonstrates the "proof of its principle": Fast-action automatic quality control, new streamlined process techniques, strides in automation, and instrument rating of newly achieved low-color levels.

Improved defecation—continuous automatic injection of acid according to flow rate, and lime according to pH—has resulted in an excellent mechanized pH control, and thus enables the clarifiers to separate the maximum amount of pectins, gums, and albumins from the liquor.

• ROBOT QUALITY CONTROL

Before installing the automatic system of adding acid and lime, an operator was responsible for treating about 100 tanks each day. He only had a few minutes per tank to see to the adding of the two chemicals

STOP VAPOR AND HEAT LEAKS

ZERO PERM* VAPOR BARRIER

reduces vapor transmission to a practical zero

ZERO PERM is formed from 1-mil aluminum with ½-mil Du Pont polyester "Mylar" film permanently laminated to each side. This combines the virtually perfect vapor proof quality of aluminum with the tough flexibility of "Mylar"—offering complete permanent protection against vapor leaks. Joints are sealed with ZERO PERM Pressure Sensitive Tape. In effect, this forms a single unbroken vapor barrier sheet enclosing the entire room, which may be inspected before insulation is applied.

*Alumiseal Corporation Trade Mark

VOID-FREE PALCO WOOL® INSULATION

reduces heat transmission to a minimum

PALCO WOOL is a natural corkscrew-like redwood bark fiber with the inherent resilience to stay in place without support so entire wall may be inspected to eliminate possibility of voids or pockets. At recommended density of 4.5 lbs./cu. ft., it displaces so much air that convection currents are virtually eliminated. Impervious to moisture effects and deterioration, it has no vapor dams to trap moisture and lower efficiency. Snug fit around all structural members eliminates joints and edge leaks. Application of interior finish is completely independent of insulation placement.

Complete open wall inspection

FULL INSPECTION ELIMINATES HUMAN ERRORS IN APPLICATION OF VAPOR SEAL AND INSULATION

1. ZERO PERM Vapor Barrier is completely installed before insulation is applied, allowing full inspection to eliminate vapor leaks.

2. *Palco Wool* is packed behind temporary retainer sheet at bottom of wall.

3. *Palco Wool* is packed behind second temporary retainer sheet.

4. Lower temporary sheet is removed, placed above second sheet, and packing process is continued. Process is repeated until entire wall is packed.

5. As temporary sheets are removed, wall is inspected to determine that there are no pockets, voids, settlement. Interior finish is then applied.

SEND COUPON FOR COMPLETE INFORMATION

THE PACIFIC LUMBER COMPANY

PALCO INSULATION WOOL®

100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

THE PACIFIC LUMBER COMPANY 702

100 Bush Street, San Francisco 4, California • Room 2404

Please send me, without obligation:

- ☐ **Complete Refrigeration Insulation Manual**
- ☐ **Sample of *Palco Wool* Insulation**
- ☐ **Information on *Zero Perm* Mylar-Armored Foil Vapor Barrier**
- ☐ **In-place test data on insulated structures**

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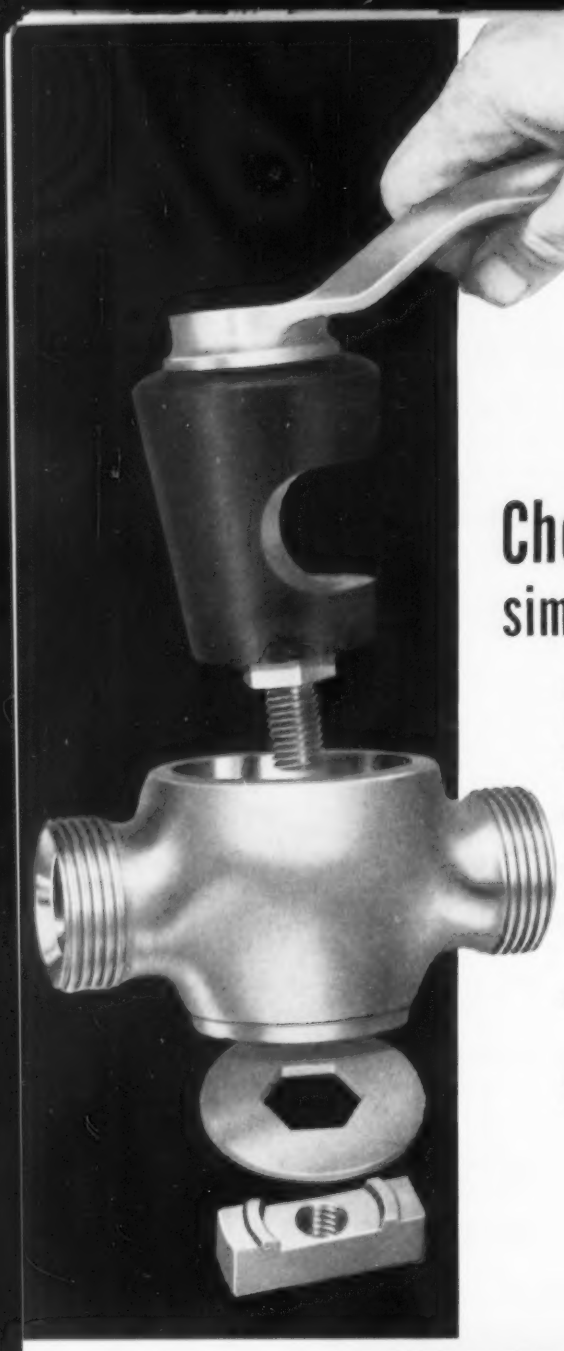


New

Cherry-Burrell "Uni-Seal" Valves simplify sanitary valve maintenance

Install new Cherry-Burrell Uni-Seal valves and forget about valve plug maintenance. No more galled and scored plugs . . . no more costly machining of seating surfaces to assure tight flow control . . . no more need to return valves to factory for reconditioning or plug replacement. Here's why:

- ***New Uni-Seal rubber-covered*** cast alloy plug does not gall or score.
- ***New Uni-Seal rubber-covered*** plug unaffected by cleaning solutions.
- ***New Uni-Seal rubber-covered*** plugs are interchangeable—one plug fits every valve of like size.
- ***New Uni-Seal rubber-covered*** plug can be changed—simply and quickly—without removing valve from line.

Available in 1", 1½" and 2" plug-type Cherry-Burrell stainless steel valves. Ask your Cherry-Burrell Representative for the story and *try them now!*

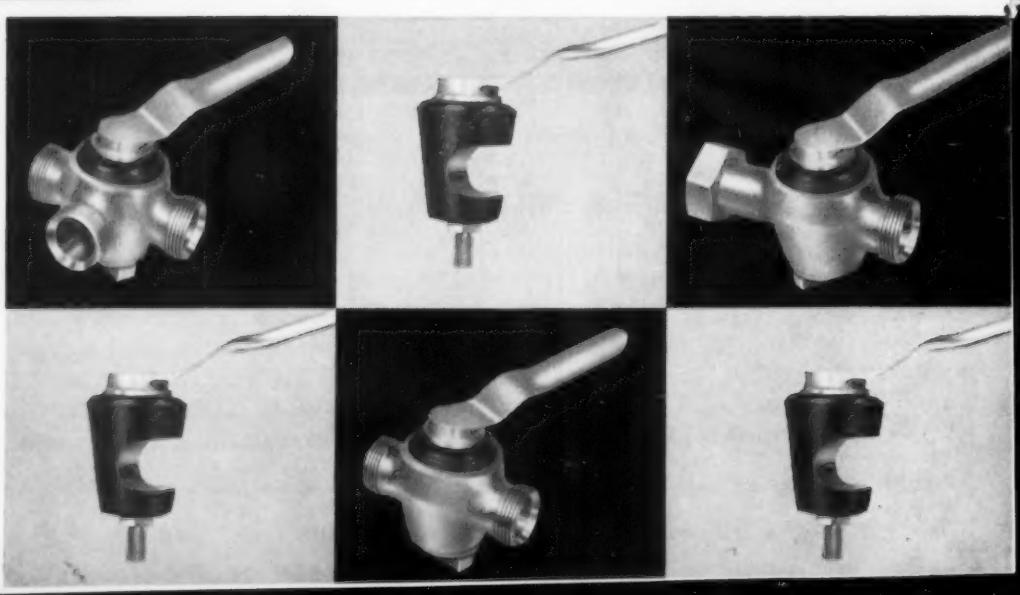
CHERRY-BURRELL
CORPORATION

427 West Randolph Street, Chicago 6, Illinois

Dairy • Food • Farm • Beverage • Brewing • Chemical Equipment and Supplies

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

ONE UNI-SEAL PLUG FITS ALL THESE VALVES



and to adjust the pH. Consequently, pH control depended on his speed and skill.

Now an instrument indicates and records flow from the melter and meters out phosphoric acid (forced by air pressure from the holding tank) in a fixed ratio to the flow rate (usually set to deliver 1 cc. acid for each gal. of liquor). Then the acid is thoroughly mixed.

Acidified liquor is treated with lime in a pipe running to a second mixer. Amount of lime added is set by throttling valve automatically adjusted to pH as measured by temperature-adjusted electrodes inserted into the line after the second mixer. A centrifugal pump moves the lime.

A manually controlled valve, located after the pH electrodes, dictates the liquor flow rate to the clarifiers. But acid and lime are added properly regardless of the setting of this valve, because reagents are delivered according to the flow rate.

Following treatment in the clarifiers another meter continuously indicates and records pH. Readings of this instrument form the basis for increasing or decreasing the ratio of acid to liquor flow rate.

This second meter is the crucial one, determining the final pH. But insurance is gained in this setup by using two pH controllers that are interchangeable (for purposes of checkup and convenient replacement).

Automatic defecation has reaped a double benefit—uniform, well-adjusted pH of clarifier liquors and big man-power savings.

• NEW TECHNIQUES

Pointing the way in the quest for a purer liquid sugar are RS&S's three advances in refining—use of monobeds containing both anion and cation resins, employment of a pressure leaf-type filter for the final polishing operation, and quicker carbon decolorizing.

Making possible a liquid sucrose of extra purity, ion-exchange monobeds reduce ash content of syrups from 0.05 to as low as 0.001%. Two units, each having a 10-ft. dia., 10-ft. straight vertical section, dished heads, and holding 400 cu. ft. of resin, demineralize 115F. syrup at 125 gpm. The resins that have served best here are IRC-50 (for cation) and IRA-401 (for anion).

Depending on the purity of syrup, these beds can be used 7 to 14 hr. before need for regeneration. Lining the interior is a special rubber that does not impart any flavor to the syrup. It was selected after testing many types.

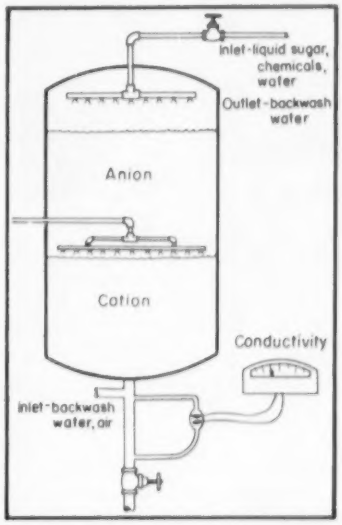
Conductivity of the effluent from the beds is recorded continuously to provide a guide for the proper timing of regeneration. Then when need for regenerating a bed is indicated by an increase in conductivity, the following operations are performed:

1. Sweetening off bed (rinsing).
2. Backwashing (wherein anion material rises to top due to differences in density and particle size).
3. Adding acid from top inlet.
4. Rinsing from top.
5. Trickling water in from bottom inlet and caustic from above (both discharging in center) until anion is regenerated.
6. Rinsing (leaving water over resin).
7. Bubbling air in from bottom to mix resins.
8. Rinsing out all reagents (their complete removal is indicated by low conductivity of rinse water).
9. Sweetening on (charging with new batch of syrup).

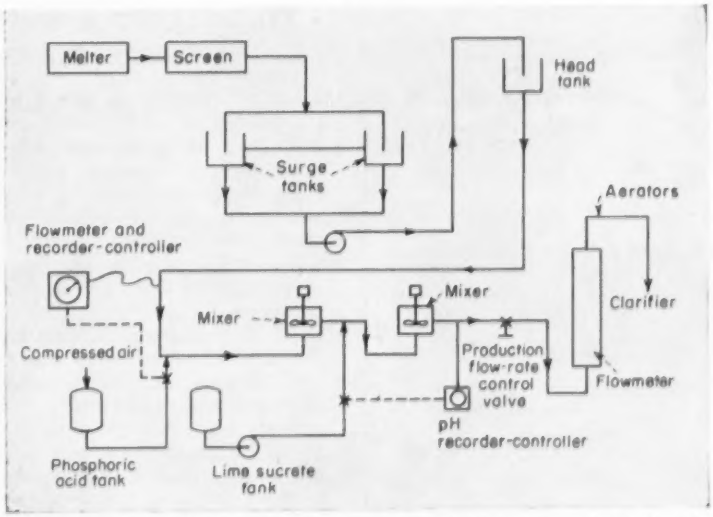
Improving Sugar Purification

New pressure leaf-type filters have made possible a cleaner polishing operation (final carbon treatment to eliminate residual turbidity). In these units, metal screens are completely enclosed, creating a slop-proof system. Screens are pre-coated, and standard filter aids are employed.

Carbon treatment has seen several notable improvements. Today, the operation is divided into four steps: First bone char treatment, second bone char, granular carbon (followed



ION-EXCHANGE MONOBED has special utility design. Top inlet admits syrup, water, acid, or alkali. Lower opening releases syrup. For regeneration of bed, center drain separates anion and cation, and lower opening is then employed for admission of water and air. Ion content of syrup and regeneration rinse are checked by conductivity recorder.



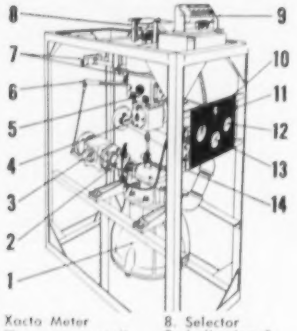
CONSTANTLY PROPER pH of liquor going to clarifier is now maintained with this new instrumental setup. It provides continuous addition of phosphoric acid and lime, precisely metered according to flow rate and pH.

Blends many liquids automatically with unexcelled accuracy

Bowser precision proportioners automatically and accurately blend two or more liquids in closed, continuous production.

A simple setting of the percentage selectors provides any variation of blend from ½% to 100%. XACTO, "the world's most widely used meter," assures perfect proportioning of all liquids being mixed, compounded or blended.

SIMPLICITY OF DESIGN SAVES SPACE . . . REDUCES MAINTENANCE



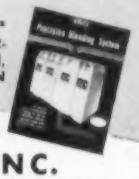
1. Xacto Meter
2. Thermometer Well
3. Inlet Control Valve
4. Differential
5. Control Nut
6. Valve Control Arm
7. Pump Control Circuit & Switch
8. Selector
9. Indicating & Totalizing Dial
10. Flow Indicator
11. Inlet Pressure Gauge
12. Discharge Pressure Gauge
13. Dial Thermometer
14. Discharge Check Valve

DIALS FOR EVERY PURPOSE

Model K — furnishes printed record of quantity dispensed or received for accounting; Model P—delivers predetermined quantities up to 10,000 gallons; Model RP — delivers predetermined quantities, repeating each quantity automatically.

FREE OFFER . . .

Write for full color, 12-page Facts Folder titled, "XACTO PRECISION BLENDING SYSTEM."



BOWSER INC.

1326 E. CREIGHTON AVE.
FORT WAYNE, INDIANA

by monobed), and polishing operation (using vegetable or granular carbon).

With the higher grade raw sugars it is often permissible to eliminate one or more steps. But in general, carbon decolorization has been stepped up, resulting in a purer and cleaner product.

Use of Pittsburgh activated carbon has enabled the company to get the full potential from the ion exchange monobeds. It lowers the color level to where the monobeds can efficiently finish the job. And use of this carbon doubles the percolation rate.

• AUTO-CENTRIFUGALS

Centrifuging is another unit operation that has seen steady improvement.

Ultimate goal here is continuous automatic operation. However, trials with this type unit have not yet worked out due to the variety of sugars encountered in this plant.

Right now, the units are run in a semi-automatic batch fashion, and the operator follows this routine:

1. Manually charges, then starts automatic sequence (steps 2-6 below).
2. Spinning (1600 rpm.).
3. Adding of rinse water (1 pt. for 1 or 2 sec.).
4. Spinning off rinse.
5. Braking.
6. Opening of bottom.
7. Blowing (by switching on separate manually controlled motor).

• COLOR CONTROL UPPED

Quality control charts to match colors of centrifuge liquors against the lab-gage of best possible color, and new instrumental methods of measuring the scantest traces of color in syrups appearing crystal clear to the eye, now help keep tab on elusive color factors.

Thereby, the checking of efficiency of color removal no longer entails confusion—for new pastel-color charts now precisely compare color of the plant-washed syrup with the optimum determined in lab washings (as represented on the chart).

Every 2 hr., a sample of sugar entering the warehouse is sent to the control lab. Here it is washed in a centrifuge, dissolved, and rated for color (Horne scale). Color reading is recorded on the chart in the form of a yellow peg. This represents a theoretical minimum of color for washed raw sugar.

At the same time, a color reading is made on a sample of washed raw sugar taken from the centrifuge baskets. A green peg represents this value on the chart. Object is sharper comparison, thus indicating more precise washing steps to bring color as close as possible to the theoretical minimum.

Factors affecting color of washed sugar, in this initial refining step include: Quality of raws, rate sugar moves through centrifugals, length of washing cycle, speed of spin-off, and overall efficiency of the machines.

A problem in quality control of high-purity liquid sugar is that the liquid may be so clear that color measurement is difficult. Formerly, color was gaged by comparison with a set of Horne color standards. Now the E_{ab} units (based on Beckman DU spectrophotometer readings), and the color index system (ratings by colorimeter) are also used. Data now being accumulated on all three tests will help determine the most suitable procedure.

View to the Future

Goal of the research staff is an automatic quality control system—employing continuous colorimeters and turbidity instruments, automatic Brix control, and other techniques—to eliminate the lag now occasioned by lengthy lab tests.

This won't abolish the need for trained quality control men, however.

They will still be required for checking on the robots and making adjustments in the process as dictated by varying raw materials and conditions.

"Well, er . . . I just figured there'd be money in it."

Drivers get set to "hit the road" with the first of the 1000 new Power Giants ordered by Ryder System, Inc.

Dodge awarded 1000-truck order

"We picked these Dodge Power Giants to give our truck-lease customers the finest hauling and delivery operation at lowest cost", James Ryder (right), president of Ryder System, Inc., tells Lee F. Desmond, vice president of Dodge.

Ryder System, Inc., world's largest exclusive truck-leasing company, puts low-cost operation first... picks Dodge for record order

When your business is leasing trucks, there's only one way to make it pay off. And that's by keeping your operating costs per mile at rock-bottom levels. That's why Jim Ryder, president of Ryder System, Inc., decided on Dodge when he needed new trucks. He knew that Dodge trucks are built to take extra miles without extra costs.

For instance, new Dodge *Power Giant* V-8's are the most powerful of the low-priced three. And that extra power lets you handle the ruggedest hauling jobs with less engine strain. Less strain means less wear and, of course, fewer repairs. Exclusive Power-Dome design delivers premium performance on regular gas, too. "I save money both ways", says Jim Ryder. "But more important, I know that my customers will be thoroughly satisfied with any Dodge *Power Giant* they lease."

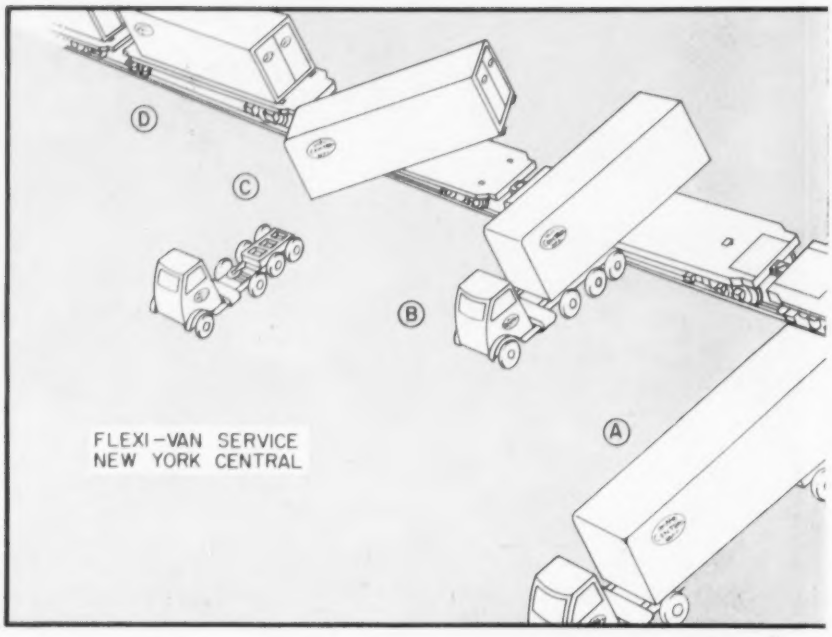
Why not do as Jim Ryder did . . . check into the facts with your Dodge dealer. You'll find a Dodge *Power Giant* will pay off for you, whatever your business.

DODGE

PowerGiants

Most Power of the Low-Priced 3

For more data, circle this page number on card at back →



NEW APPROACH to rail-truck transportation features use of highway trailers with easily detachable wheel assemblies, and hydraulic lift-tables on standard flat cars. Four-step loading routine is sketched above. And it keys to closeup photos on right.

Streamlines Piggyback

New York Central makes big "trailer-railing" bid with revolutionary package-form freight service

MARK UP another convert to "piggyback" rail-trailer transportation—the New York Central System, which has just unveiled its "Flexi-Van-Service" of freight handling.

Developed by the railroad's wholly owned subsidiary, New York Central Transport Co., in cooperation with Fruehauf Trailer Co., the system makes use of an entirely new approach.

Central contends it has the following big advantage over previously employed piggyback systems:

1. Speeds transfer of trailer from highway to rail operation and back again.

2. Eliminates expensive loading equipment and dock facilities.

3. Reduces weight, center of gravity, and height (the latter so present underpasses may be used).

4. Abolishes expensive, time-consuming anchoring of wheeled trailers to rail cars.

5. Cuts down yard-switching costs and accelerates movement of freight between carriers using the equipment.

6. Makes for greater use of each trailer wheel unit, since licenses will stay with it.

7. Enables simultaneous mass unloadings and loadings of dozens of flat cars.

The service employs a new technique, patented by NYCT's President Leo Mellam, for separating wheel assembly from loaded highway trailer, then placing trailer aboard railroad flat car. This is made possible by a slight modification in the trailer, wheel assembly, and car.

Transfer of a Flexi-Van from highway tractor-trailer to a flat car is run off in the following manner:

A. Tractor-trailer unit is backed up to flat car along any road beside a railroad track.

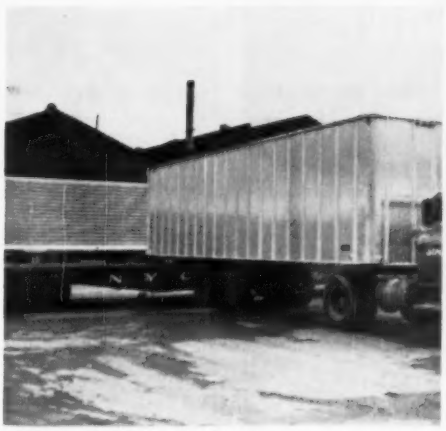
B. Trailer body is then slid (over special tracks mounted on under side of its frame), onto the turntable of flat car, until it is completely freed from its wheel assembly. Motive power is furnished by the tractor.

C. One man then pushes the trailer into place, parallel to the rails.

D. Self-locking device secures trailer in place ready for transportation by rail.

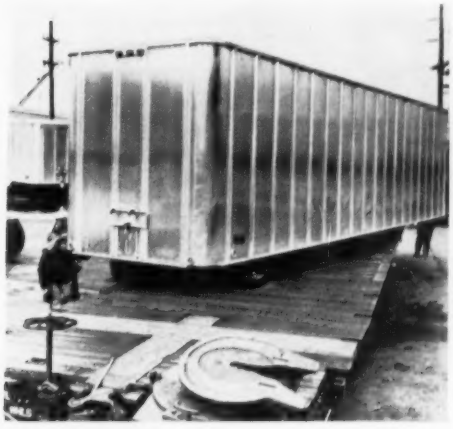
Entire change over from highway trailer to flat car (or vice versa) is said to require only 4 min.

To compensate for different ground levels beside tracks, turntable



A BACKING UP: With its rear road wheels unlocked, trailer is easily backed onto flat car equipped with a specially-developed hydraulic lift-table.

B TRANSFERRING: Once it straddles flat car, the Flexi-Van trailer is automatically locked to hydraulic lift-table. Rear wheels, now under forward end of trailer, are completely detached from it.



C POSITIONING: Lift-table raises trailer, enabling it to be swung parallel to tracks. When lowered, trailer is automatically locked to car.

D READY TO GO: Now in place, the trailer sits securely on the standard flat car. Entire loading operation has taken only 4 min.

on flat car is mounted on a hydraulic lift that enables it to be raised or lowered as needed.

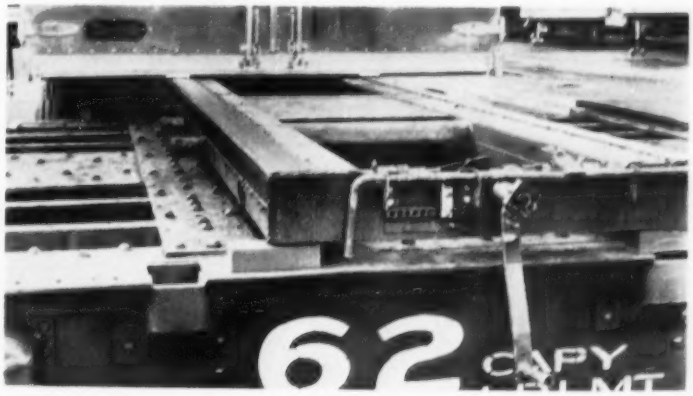
Flexi-Van Service will be operated in self-contained fashion, within the New York Central System, by the company's freight sales and service department and NYCT.

Also planned by Central is handling of water-rail operations, employing an adaptation of the new principle.

Other Roads Like Piggy

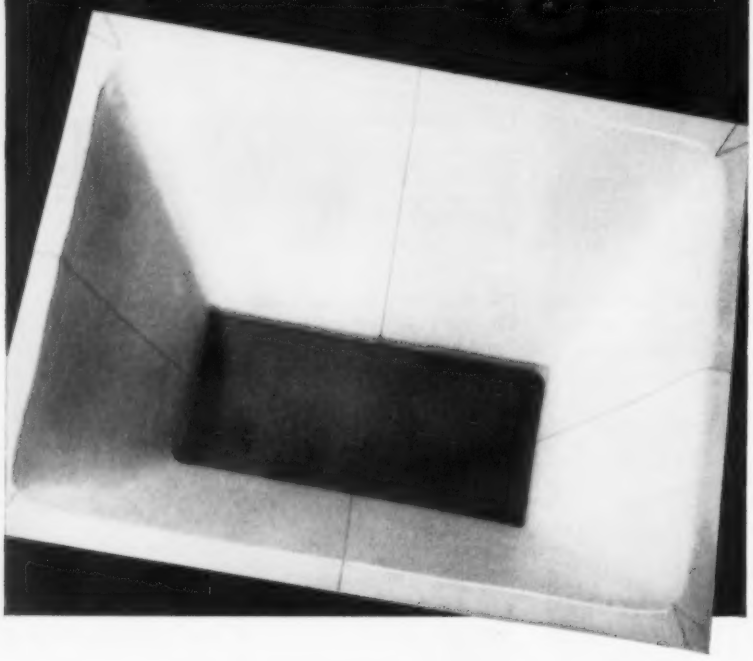
WHAT HAVE been the experiences of other carriers with piggyback?

Since 1954—with its big swing



HYDRAULIC LIFT-TABLE is key to conversion of regular flat car for piggyback service. When trailer is backed up to car, pin release allows it to slide off road wheels onto table, where its load center is automatically determined. When properly balanced, trailer is locked to lift.

Cementable TEFLON solves sticky food-handling problems



Slipperiest material provides non-stick sanitary surfaces for . . .

- Hoppers
- Chutes
- Conveyor guides
- Packaging machine guides
- Filling machines
- Work tables
- Confectionery molds
- Baking pans
- Pastry flats
- Mixers
- Feeders
- Bins, etc.

Lining hoppers, chutes, feeders, bins—slippery TEFLON* reduces surface friction. Dry powders and other materials flow freely. Eliminate need for vibrators or manual attention.

On guide rails of conveyors and packaging machines—food products are not damaged, packages are unmarred, no "jam-up" occurs.

On work surfaces—clean up time is reduced to a minimum and sanitation is greatly improved.

As coverings for candy bar frames, cookie flats, bakery rolls, proving pans—sticky products "come clean" without assistance.

Find out about this slipperiest of all solid materials that is also chemically inert, non-contaminating, tasteless, odorless, has zero water absorption.

Made in inexpensive tape in continuous rolls and in sheets up to 48" x 48" in size.

Readily cemented with commercial adhesives to any metal, wood, concrete, plastic, glass or other surface of new or existing equipment.

Write for Bulletin AD-158.

*du Pont trademark

United States Gasket Company
Camden 1, New Jersey

United States Gasket *Plastics Division*
OF THE GARLOCK PACKING COMPANY

to piggyback—railroads have continued to adopt this type service until more than 20 are now offering it. Loadings now exceed 20,000 trailers per month.

And when Florida East Coast RR arranged to haul trailers between Jacksonville and Miami recently, all parts of the country (except between Washington and Jacksonville) finally had a stake in piggyback.

Originally adopted by most roads was the "all-rail" type service under which trailers were owned or leased by the carrier. Pickup and delivery in terminal areas is usually by truckers having contracts with the roads.

Early in 1955, however, the Pennsylvania supplemented its TrucTrain service with the "common carrier" type, using specially designed 75-ft.-long flatcars accommodating two trailers. This service has been extended (through arrangements with other carriers) to many parts of the country. In fact, 12 railroads are now providing "c-c" service.

Simultaneously, the Penn. extended its "all-rail" service to the Twin Cities and the Southwest through connections with the North Western and four southwestern roads. In 1956, this carrier averaged 1,200 trailers per week, of which 60% were common carriers. Revenue was running at a $15,000,000 rate at year end.

The Lackawanna, which operates on the "all-rail" plan exclusively, now has 300 converted flatcars (each capable of handling one trailer) and approximately 350 trailers. Through 16 connecting carriers it provides service to more than 600 stations from Portland, Me., to the West Coast and the Southwest.

This road reports revenue from piggyback traffic in '56 as 2.3c. per ton-mile, which is 44% greater than the average 1.6c. for all traffic.

". . . It's just until we get that broken section repaired."

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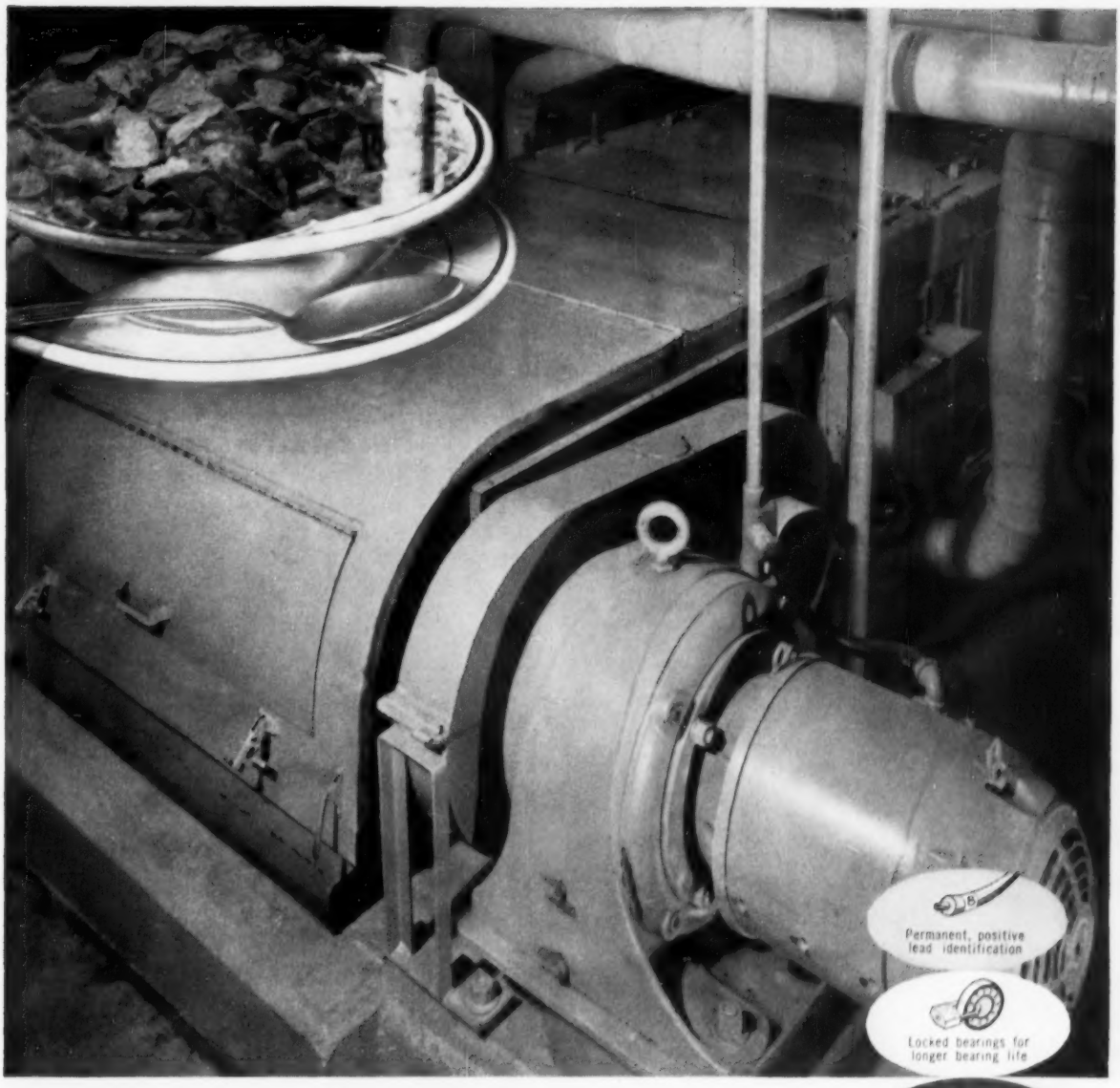

How to keep corn-flakes moving...

Louis Allis motors provide reliable drives, uninterrupted process flow

Modern food processing systems require dependable drives to keep production flowing smoothly. A minor motor breakdown often means costly waste, as well as loss of production.

That's why many segments of the food industry are turning to Louis Allis for help in powering food-handling machinery. Louis Allis engineers, expert in food systems installations, are available to advise you on correct drive applications. Their recommendations often can save you money on the initial installation, as well as eliminate a source of future problems.

What's more, all Louis Allis equipment is pleasingly styled to blend well into today's modern publicly-viewed food plants, where appearance is important.

Why not ask for a list of food plants in your area using Louis Allis motors? See what *they* say. Contact your Louis Allis District Office, or the Louis Allis Co., 442 E. Stewart Street, Milwaukee 1, Wis.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

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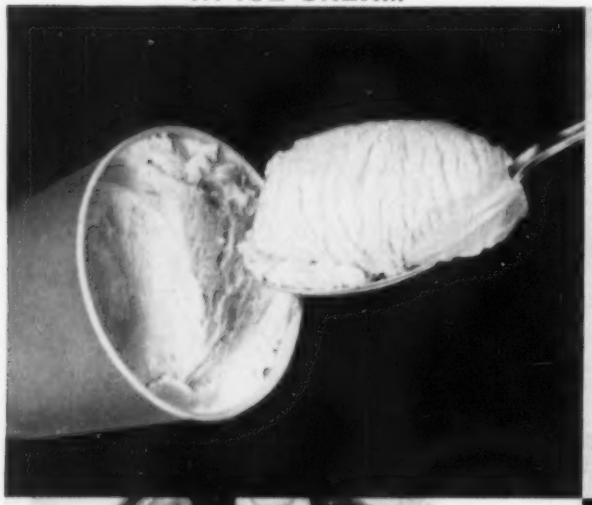
Tailored to meet exacting food specifications...

REX® corn syrup—high in total sugar content —lowest viscosity of any corn syrup—easy to handle

GLOBE® corn syrups—medium and regular conversion—available in a range of viscosities

Promote smooth, uniform texture, true flavor
IN ICE CREAM



Preserve natural color and flavor of fruit
IN FRUIT PIES

IN CONFECTIONERY
Assure better grain control, longer shelf life

IN CANNING
Preserve true color, enhance natural fruit flavor

Technical assistance in developing improved formulations available on request.

CORN PRODUCTS SALES COMPANY
17 Battery Place, New York 4, N. Y.

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Now—Better Polyester Films

- Heat-shrink type excells in skin-tight pack
- Special coatings enhance natural properties

FE STAFF

TWO IMPROVEMENTS in polyester film—opening up new packaging opportunities for this tough, clear plastic—were unveiled by duPont at the recent AMA Packaging Show in Chicago.

▶A heat-shrinkable oriented Mylar, developed in cooperation with Wilson & Co., Chicago, is already being used by this meat packer as a strong, skin-tight wrapper for its new line of ready-to-eat hams.

Here, exclusion of air boosts product protection and color retention, while the ability of this material to withstand rough handling further minimizes spoilage that stems from torn packages.

▶And additional flexibility has been added to standard Mylar by coating it with a modified polyvinylidine chloride—and by even further laminating this combination with polyethylene.

These latter products, now available in limited commercial quantities, are seen particularly suitable for boil-in-the-bag, luncheon meat, cheese, candy, and cookie packages, where production and marketing conditions necessitate a film that is quickly and easily heat-sealed and possesses high gas and moisture impermeability.

The oriented film, obtainable in ½-mil continuous tubing or pre-cut lengths, is easily shrunk in standard, hot-water-dip equipment. Once shrinkage is complete, the plastic acquires the same dimensional stability possessed by standard Mylar.

Despite this change, the new product has high transparency, extreme durability from —80 to 300F., top tensile strength, excellent tear resistance, and impermeability to fats. However, like standard Mylar this film must presently be heat-sealed with a combination of heat and a solvent.

Coated Films Improve Heat Seal

In contrast, main feature of the coated films is a dramatic improvement in heat sealability. Polyester of ½-mil thickness, coated with less than a ¼-mil of a modified vinylidine chloride copolymer (a Saran-type plastic), can be run on standard, high-speed packagers with only minor modifications.

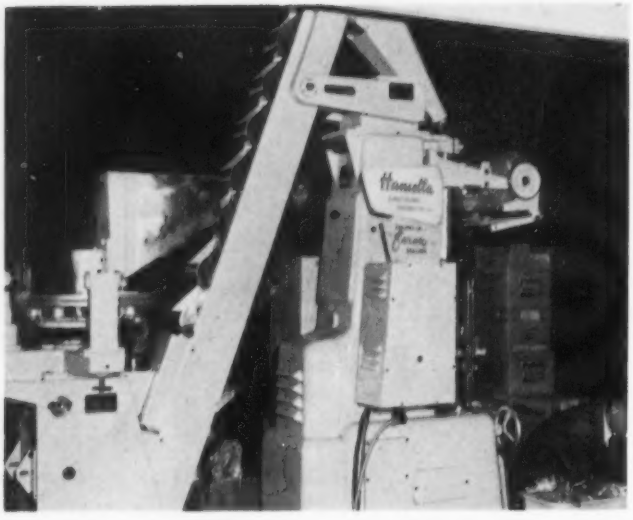
Further, the extra barrier to moisture vapor and gasses that this coating adds to the natural protection of Mylar itself, yields a material particularly suited to difficult bag, overwrap, and vacuum packaging applications, where transmission rates are critical.

Market tests have already been successfully run on candy and cookie packs utilizing this material, and a polyethylene combination has been tried for vacuum-packed meats and cheese. Meantime, duPont researchers are continuing to explore the new films to evaluate their protective qualities from statistical and economic standpoints.

NEW FILMS IN ACTION. Top: Shrinkable polyester is applied to pre-cooked hams by Wilson & Co. Center: Superior strength of the oriented film resists tearing even from sharp lobster claws. Both packages are clip-closed to avoid difficult heat sealing. Above: Hygrade Food Products Corp., Detroit, uses polyester-polyethylene combination for corned beef.

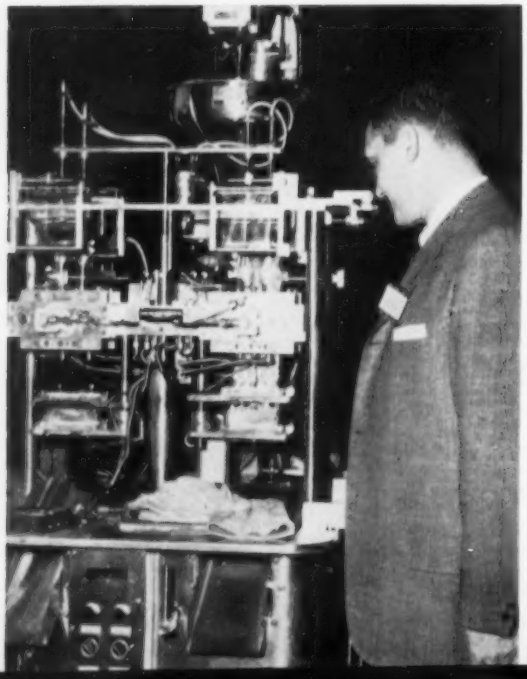
Packaging Show Unveils

High speed, efficiency, and flexibility best describe the newest in film packers, wrappers, sealers, fillers, check weighers, coders, and converters displayed at AMA's Chicago Exposition



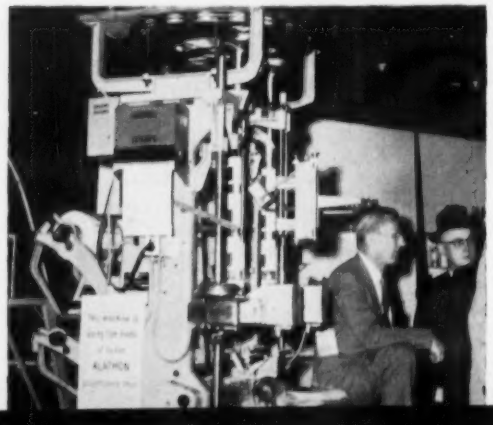
5 Continuous Pouch Packers

SINGLE-COLUMN pouch packager handles roll-fed Saran film and forms it into pouches that are filled and sealed at speeds up to 60 per min. Compact unit is equipped with a bucket elevator that carries products from 12-head volumetric dispenser (left) to pouch former (right).—Hansella Machinery Corp., Palisades Park, N. J. (86A)



FILLER-PACKAGER pouches liquids and powders at 180 per min. Accurate mechanism dispenses materials in quantities from ½ ml. Reverse vacuum device insures sharp product cut-off.—Brown Bag Filling Machine Co., Inc., Fitchburg, Mass. (86B)

NEW IMPULSE SEALER on Stokeswrap machine cuts film waste on polyethylene sealing applications. Technique also gives strong, positive seal on other thermoplastic films.—Stokes & Smith Co., Philadelphia. (86C)

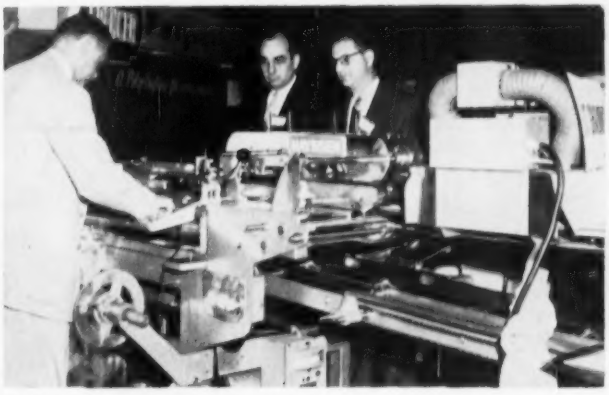


43 Real Cost Cutters

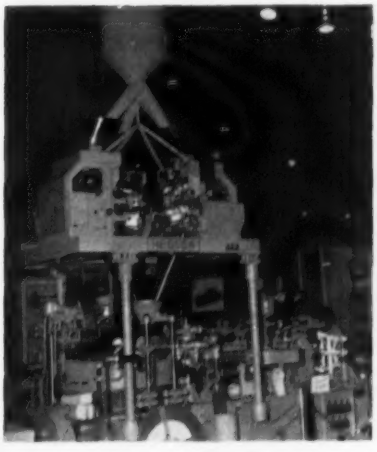
CHUB PACKAGER utilizes unique hot-air-blast sealer to form 30 wraps per min. from polyethylene film up to 4-mil thick. Air is heated in a coil by induced current. Variations in current and air flow give close sealing control.—Kartridge-Pak Machine Co., Chicago. (87A)

FORM, FILL, AND SEAL packager employs direct-sealing electrically driven rolls to pouch liquids, solids, and powders in flexible materials. Forms single or attached units at speeds to 400 per min.—The Bell Machine Co., Oshkosh, Wis. (87B)

1 Tray Wrapper, 3 Baggers



TRAY WRAPPER utilizes oriented Pliofilm that is heat-shrunk after sealing to tightly conform to packaged products. Film's tear and puncture resistance reduces re-wraps and boosts package appearance. Compact unit has short stroke and smooth cam operation for high-speed positive operation. Electric-eye registry governs application of printed films.—Pliofilm supplied by Tee-Pak, Inc., Chicago. (87C) Overwrap machine displayed by Hayssen Mfg. Co., Sheboygan, Wis. (87D)

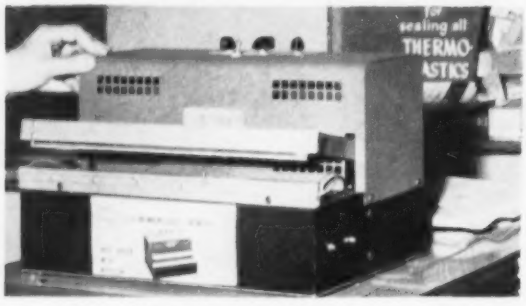


BAGGER has dual precision weighers. It cuts film into sheets that are mandrel-formed and glued. Outer wrap is formed around inner bag and transferred to filling wheel. Top card is added to package before final glue closure.—Fr. Hesser Maschinenfabrik Aktiengesellschaft, Stuttgart-Bad Canstatt, Germany. (87E)

AUTOMATIC BAGGER for multiwall packages (25 to 125-lb. capacities) positions, opens, fills, closes, and sews units with or without bound-over tape. Handles 6-12 bags per min. Vibratory settler shortens filling time. Bag magazine holds 450 3-wall bags, 300 5-wall containers.—St. Regis Paper Co., N. Y. C. (88A)

PULSATING-FEED PACKER fills eight, 100-lb. bags per min., and handles containers from 25 to 150 lb. Two-stage feed tray cycles between fast and controlled rates for accurate weights.—Bemis Bros. Bag Co., Minneapolis. (88B)

4 Bag-Closing Devices



THERMAL IMPULSE SEALER with recycler employs electro-magnetic means to compress sealing jaws. Switch sets machine for single or continuous operation.—Vertrod Corp., Brooklyn, N. Y. (88C)

BAG TAPER closes 50 bags (10-lb. size) per min. Operator guides bag into machine, which then applies tape closure automatically.—J. H. Platt & Son, Los Angeles. (88D)

VACUUM OR GAS PACKER heat-seals 10 to 15 pouches per min. Snorkel device extends into bag, withdraws air or introduces gas, then withdraws.—Cheslam Corp., Yonkers, N. Y. (88E)

TAPING ATTACHMENT for bag forming and filling machine applies adhesive, metallic ribbon to cellophane bags. Device assures air-tight package seal.—LU MO Corp., Ottumwa, Iowa. (88F)

Faster handling speeds bulky loads in production line technique through wide Jamison Aluminum Clad Double Vestibule Track Doors. Note extra protection of aluminum kickplate.

Huge loading dock is spotted with Jamison Doors that lead directly into cold storage and sub-zero rooms.

New Food Fair warehouse with aluminum clad doors a Jamison FIRST

Minimum cold loss is afforded by Jamison Double Vestibule Super Freezer Door. Frostop—which prevents door from freezing shut—is on frame and astragal. Construction is aluminum cladding with aluminum kickplate.

For the 57 Jamison Cold Storage Doors installed in their new Florida warehouse, Food Fair specified aluminum cladding for protection against corrosion, mechanical damage and vapor penetration. Jamison aluminum cladding also provides bright, easy-to-clean surfaces and lighter weight doors.

Jamison Doors have been recognized as the practical and economical solution to warehousing problems everywhere. For help with *your* problem, or specific data on Jamison aluminum cladding, write to Jamison Cold Storage Door Co., Hagerstown, Md.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

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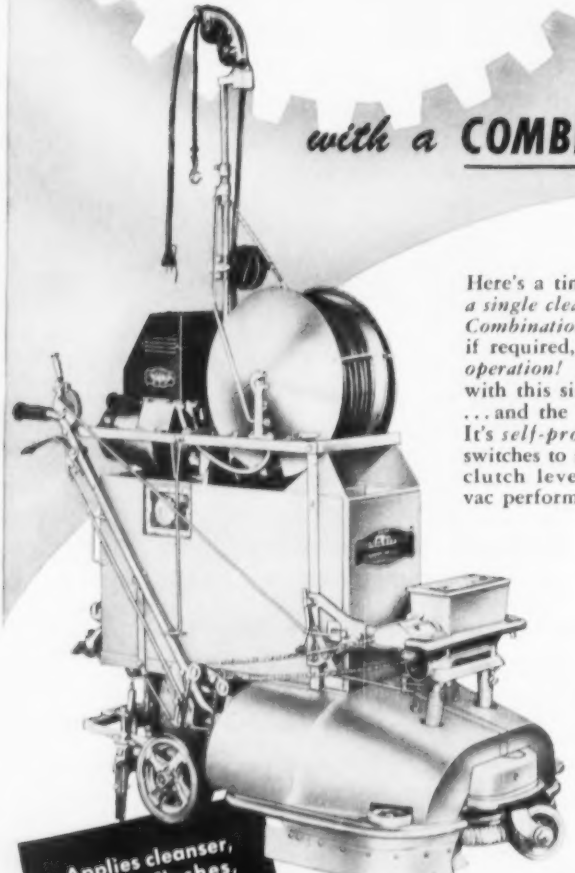
MECHANIZE all Scrubbing Operations into 1

with a COMBINATION SCRUBBER-VAC!



Applies cleanser, scrubs, flushes, and picks up—in ONE operation!

(Powder Dispenser and Level Cable Wind are accessories)

Here's a timely answer to the need for reducing labor costs—*a single cleaning unit that completely mechanizes scrubbing.* A *Combination Scrubber-Vac* applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like the convenience of working with this single unit... the thoroughness with which it cleans ...and the features that make the machine simple to operate. It's *self-propelled,* and has a *positive* clutch. There are no switches to set for *fast* or *slow*—slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs quietly.

Finnell's 213P Scrubber-Vac at left, an *electric* unit for heavy duty scrubbing of large-area floors, has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera. (The machine can be leased or purchased.) *Finnell* makes a full range of sizes, and *gasoline* or *propane powered* as well as *electric* models. From this complete line, you can choose the size and model that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that *a Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of the machine and to make periodic check-ups.

For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5705 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

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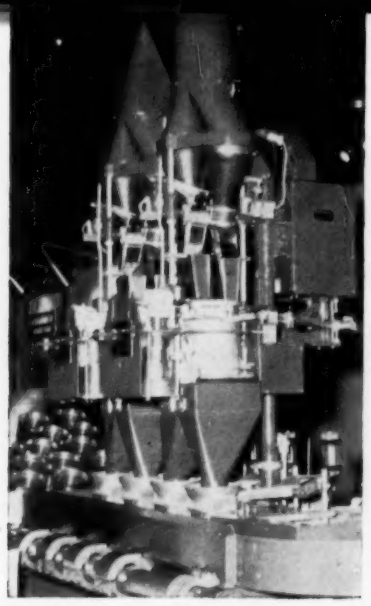
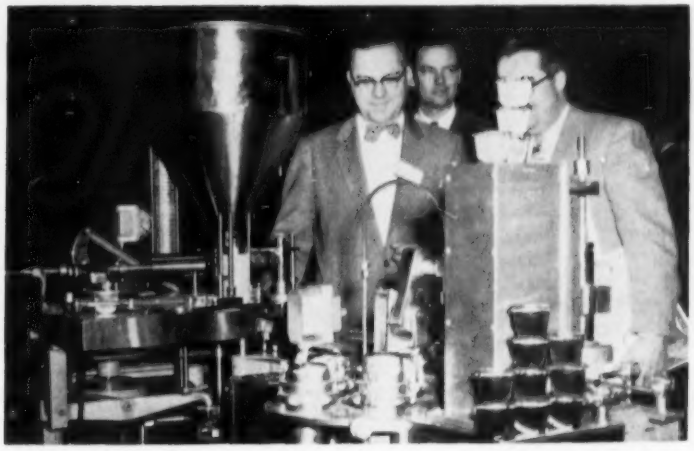
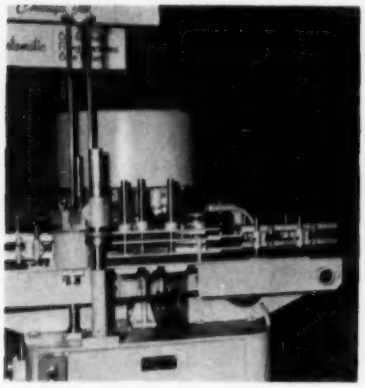


AUTOMATIC NET WEIGHER is equipped to weigh and fill granular materials (such as coffee) into cans. Accuracy: Within $\frac{1}{64}$ oz. Two-head machine handles 40 cans per min.—B. F. Gump Co., Chicago. (91A)

2 Can Fillers, 2 Cappers

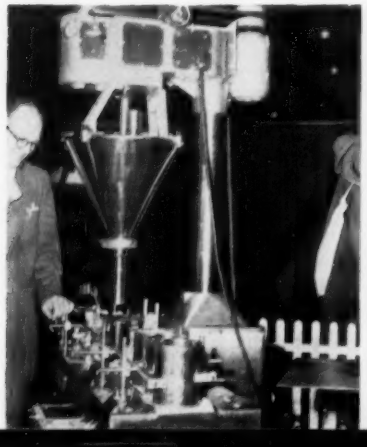


REDESIGNED FOIL-CUP CAPPER employs a rotary 4-head cap supply to give increased flexibility and fast product change-over. New cap stop prevents a lid from feeding into unit if there is no container. Adjustable-speed machine is reputed to have hit speeds of over 100 cups per minute.—Basca Mfg. Co., Indianapolis, Ind. (91B)

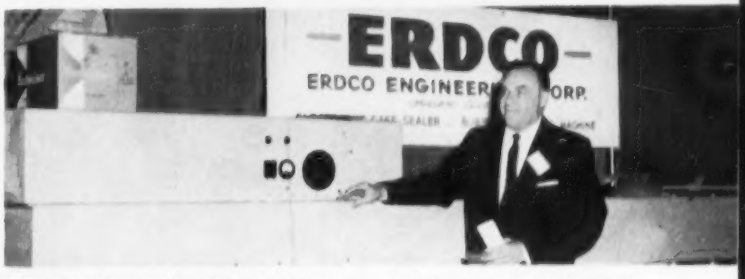


CAN SEAMER with 4 to 8 roller heads has capacity of 70 to 400 containers per min., handles metal or paper-body cans.—J. R. Nalbach Engineering Co., Chicago. (91C)

AUGER-TYPE FILLER puts liquids or powders into jars, cans, or cartons at 60-per-min. speed. Filling volume ranges from grams to 5 lb.—Bartelt Engineering Co., Rockford, Ill. (91D)

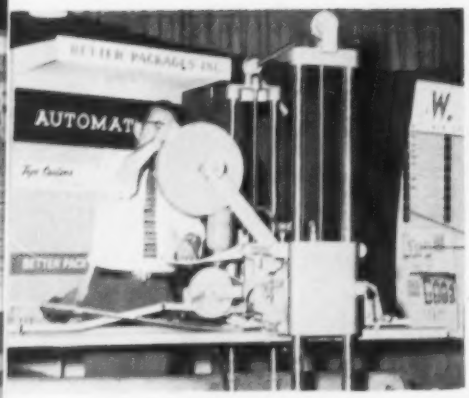


3 Case Sealers, Special Shipper



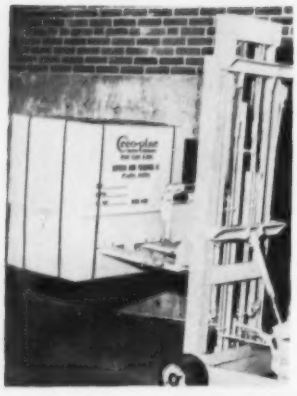
ELECTRONIC CASE SEALER takes up only 4 ft. of space. It glue-seals without need of compression belts. Unit is readily adjustable for different case sizes. It handles up to 30 cases per min.—Erdco Engineering Corp., Addison, Ill. (91E)

STRAPPING MACHINE applies tape for bundling or reinforcing cartons and shipping cases. Output is over 700 straps per hr. Unit employs Permacel tape or cloth straps.—Displayer: Permacel Tape Corp., New Brunswick, N. J. (91F)



TAPE DISPENSER mounts on table or conveyor, automatically measures correct tape length for sealing cases.—Better Packages, Inc., Shelton, Conn. (92A)

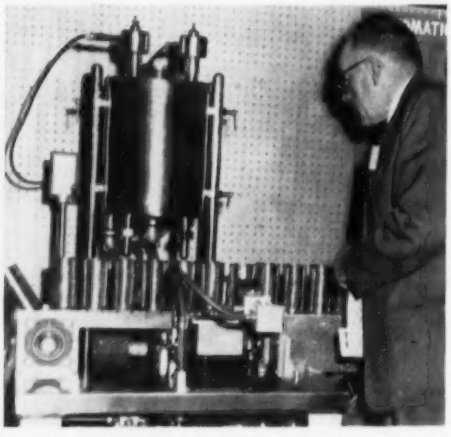
CASE SEALER tape-seals shipping cartons along top, center seam at 40-per-min. speeds, is equipped with box indexers, and flap closer.—Better Packages, Inc., Shelton, Conn. (92B)



CORRUGATED SHIPPER has built-in pallet and is punctured for lift truck handling.—Gaylord Container Corp., St. Louis. (92C)

5 Check-Weighers, Counter

PHOTO-EYE READ-OUT SYSTEM on Shadowgraph scale (right) indicates over-under weights by means of light signals. Photodiodes on scale are adjustable for a tolerance range. Center-tower scale (left) has sensitivity of 1/80 oz.—Exact Weight Scale Co., Columbus, Ohio. (92D)



CHECK-WEIGHER on time-interval filler gives individual can control. Each container is pushed onto scale. Off-weights actuates servo-motor to increase or decrease filling time.—Mojonnier Assoc., Inc., Franklin Park, Ill. (92E)

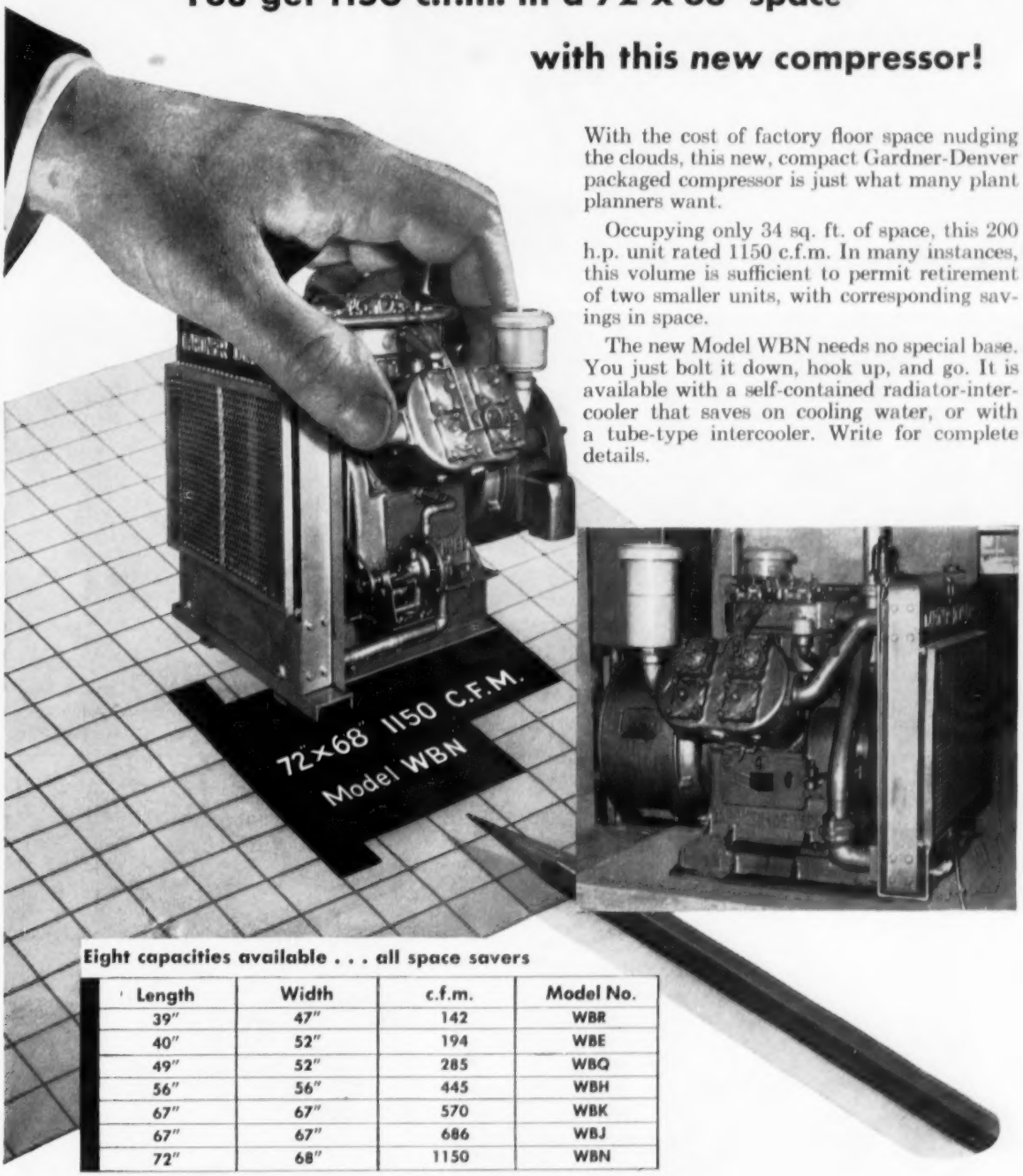
CASE WEIGHER employs intermittent conveyor to check shippers at 35-per-min. rate. Unit gages changes in overall case weights.—Scale Specialties & Systems, Inc., Roseland, N. J. (92F)

PACKAGE CLASSIFIER check-weighs small containers at 50 per min. Electronic senser is pre-set at desired tolerance.—Toledo Scale Co., Toledo, Ohio. (92G)

BATCH COUNTER consists of a mechanical feeder coupled to an electronic counter for precise numerical fill of pelletized products.—Burnet Co., Paramus, N. J. (92H)

Your own plotting will prove it!

You get 1150 c.f.m. in a 72"x 68" space with this *new* compressor!



With the cost of factory floor space nudging the clouds, this new, compact Gardner-Denver packaged compressor is just what many plant planners want.

Occupying only 34 sq. ft. of space, this 200 h.p. unit rated 1150 c.f.m. In many instances, this volume is sufficient to permit retirement of two smaller units, with corresponding savings in space.

The new Model WBN needs no special base. You just bolt it down, hook up, and go. It is available with a self-contained radiator-intercooler that saves on cooling water, or with a tube-type intercooler. Write for complete details.

Eight capacities available . . . all space savers

Length	Width	c.f.m.	Model No.
39"	47"	142	WBR
40"	52"	194	WBE
49"	52"	285	WBQ
56"	56"	445	WBH
67"	67"	570	WBK
67"	67"	686	WBJ
72"	68"	1150	WBN

ENGINEERING FORESIGHT — PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

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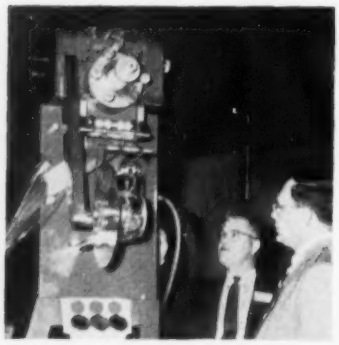
3 Cartoning Units, 1 Cap Press

GLASS MULTI-PACKER encloses jars and bottles in "window-lock" cartons that contain built-in dividers to reduce breakage. Carton blanks are hopper-fed, and containers are packed, sealed, and delivered at the rate of 20 multi-packs per min.–Gardner Board & Carton Co., Middletown, Ohio. (94A)

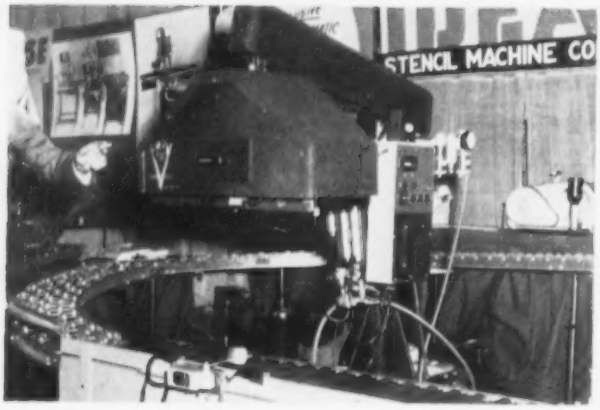
CARTONER forms, closes, and seals up to 60 packages per min. Hopper-fed cartons are formed by plunger die. Pressure-sensitive tape is applied automatically.–Waldorf Paper Prod. Co., St. Paul. (94B)

CARTON SET-UP machine turns out 60 units per min. Handles wide size-range of double-locked cartons. Special coatings available.–St. Regis Paper Co., Great Lakes Box Div., Cleveland. (94C)

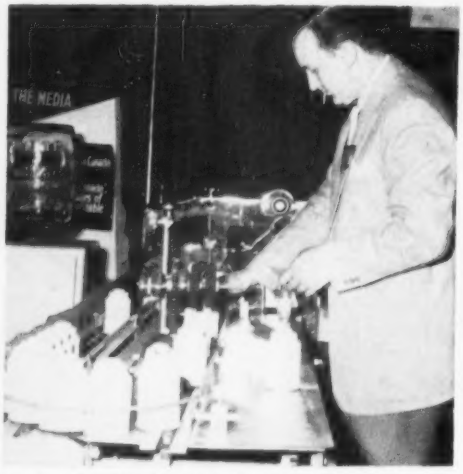


NEW CLOSURE PRESS stamps container lids and trays from roll-fed foil (up to 6-in. wide). Will turn out up to 12,000 units per hr.–Basca Mfg. Co., Indianapolis, Ind. (94D)

2 Coders, 2 Imprinters



AUTOMATIC STENCILER positions cartons for precise marking at 30 cases per min. Machine adjusts itself for varying carton heights to reduce changeover times. Counter shuts unit down at pre-determined number.–Ideal Stencil Machine Co., Belleville, Ill. (94E)



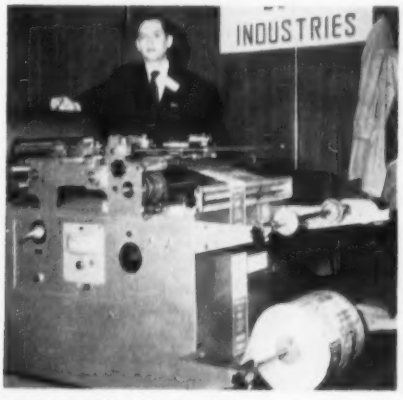
END CODER places inked identification on top or bottom of flat or aerosol-type cans. Unit handles 120-240 cans per min. Ink feeds from well through disk sponges to rotary marking head.–Kiwi Coders Corp., Chicago. (94F)

HIGH-SPEED IMPRINTER turns out up to 6,500 inked impressions per hour on labels, carton blanks, envelopes, and other flat paper goods. Inking system provides even coverage for widths to 11¼ in. Bottom stock-feed permits reloading without press stoppages.—B. Verner & Co., Inc., N. Y. C. (95A)

GLASS CODER features positive, non-jamming worm feed that puts jars through at 60-120 per min. Continuous groove on rotary coding wheel permits any number of letters or numbers to be applied.—Kiwi Coders Corp., Chicago. (95B)

4 Converters, 1 Printer

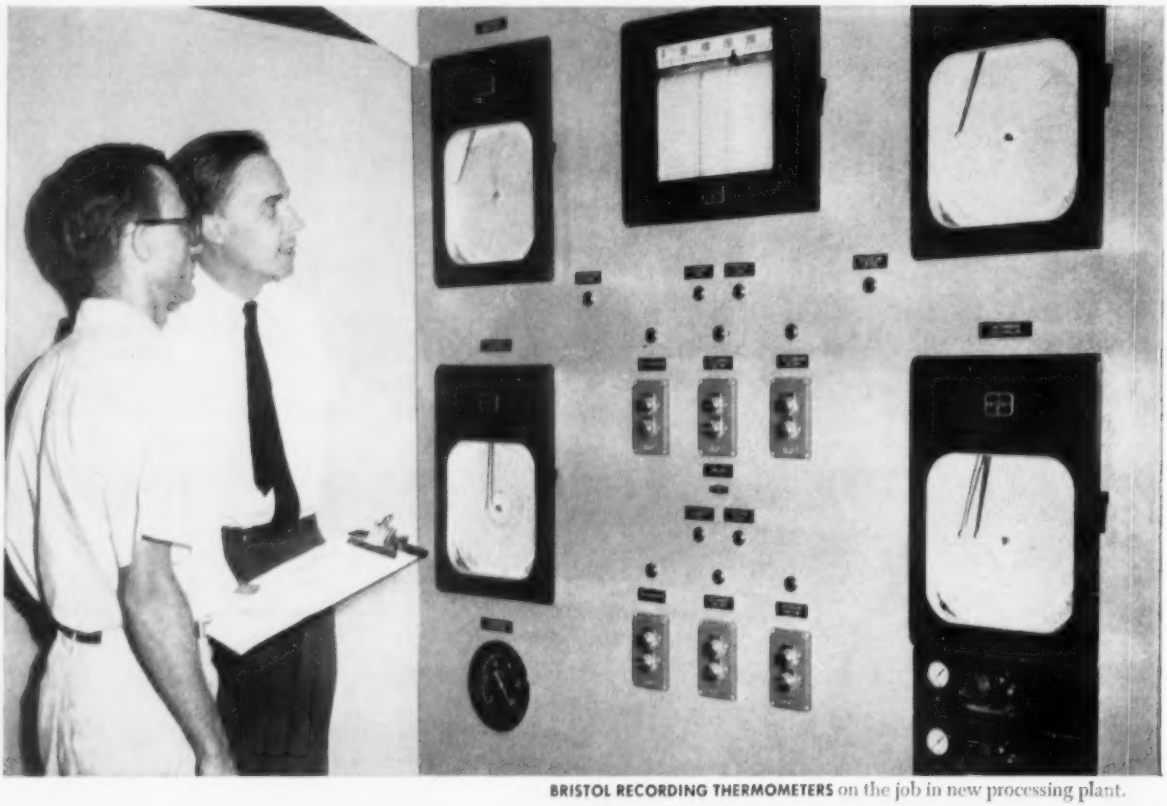
BAG MAKER turns out up to 120 polyethylene containers per minute. "Flying knife" converts machine from side-weld to conventional seal. Unit will produce bags from flat or gusseted tubing in single or multiple webs up to a 41-in. sealing surface.—Schjeldahl Co., Northfield, Minn. (95C)



POLYETHYLENE CONVERTER forms bags (tubular, pouch, center seam, side weld, or perforated) in a variety of sizes at 100-per-min. speed. Three-way electric eye maintains registry.—Delro Industries, N. Y. C. (95D)

CELLOPHANE SHEETER and stacking machine cuts roll-fed film for on-the-spot wrapping operations. "Dancing rolls" maintain accurate cut-off. Vibrator aids stacking of 600 sheets per min.—Peters Machinery Co., Chicago. (95E)

WHAT'S NEWS AT BRISTOL...



BRISTOL RECORDING THERMOMETERS on the job in new processing plant.

Can you pass this recording thermometer quiz?

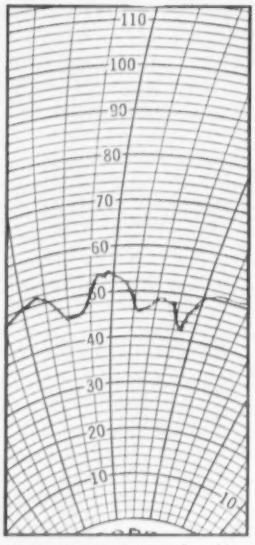
Question: ***Why do Bristol Recording Thermometers continue to lead the field?***

Answer: ***Because of Bristol's continuous research and development program. Two outstanding results of this program are:***

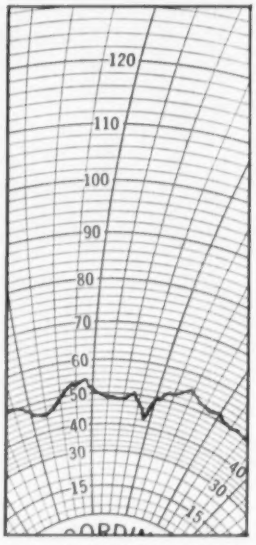
1. The 2L Uniform-Scale Vapor Pressure Thermometer which gives you all the advantages of vapor pressure thermometer actuation without the problems of the conventional non-linear increasing scale—*greatest advance in recording thermometers in 25 years.*

2. A basic improvement that eliminates ambient temperature effects. Whether you are measuring *above, below* or *at* ambient temperature, you get the same unvarying accuracy with the new Bristol Vapor-Pressure Recording Thermometers.

Want to know more? Write today for free 48-page bulletin T840 on the complete line of Bristol Recording Thermometers, liquid, vapor-pressure, and gas filled for every application. It tells all about typical installations, ranges, charts, bulbs, tubing. The Bristol Company, 115 Bristol Road, Waterbury 20, Conn.



NEW LINEAR CHART for 2L. Note easy readability due to equal chart increments.



OLD NON-LINEAR CHART. Note how scale values crowd together at bottom.

6-82

BRISTOL

TRAIL-BLAZERS IN PROCESS AUTOMATION

BRISTOL'S

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

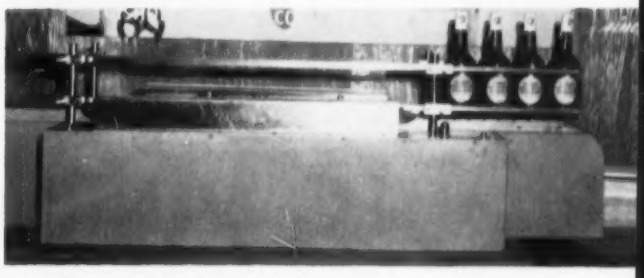
← For more data, circle this page number on card at back

PRINTING ATTACHMENT for overwrapping or bundling machine eliminates inventory of pre-printed stock and permits use of lower-cost wrapping paper. Unit is easy to install.—Exhibitors: Adolph Gottscho, Inc., Hillside, N. J. (97A); and Hobbs Mfg. Co., Worcester, Mass. (97B)

CORRUGATED CONVERTER feeds, cuts, and scores roll-fed single-faced corrugated paper. Models are also available for handling films, kraft, and coated papers. Takes sheets from 6 to 96 in. long, rolls up to 36-in. wide.—Rosenthal Mfg. Co., Chicago. (97C)

2 Counters, Spotter, Detector

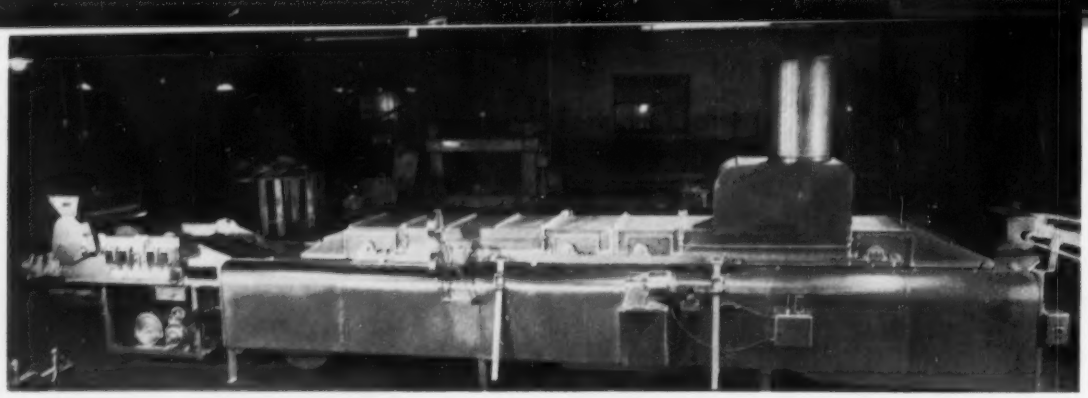
ROTARY-HEAD NUMBERER (left) holds ten characters, a dash, and a blank. It imprints code on labels at the rate of 31 in. per sec. Consecutive numbering machine (right) operates at 21 in. per sec.—Pitney-Bowes Inc., Stamford, Conn. (97D)



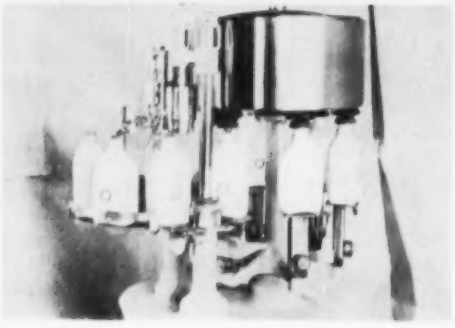
BOTTLE SPOTTER automatically positions round glass containers for labeling. Instantly adjusts for all diameters between $2\frac{7}{16}$ and $3\frac{1}{4}$ in. Variable speed drive. Capacity: 50-150 bottles per min.—Gisholt Machine Co., Madison, Wis. (97E)

HUMIDITY DETECTOR determines moisture conditions inside packages without breaking the seal. Comprises electrical resistance sensing element and housing.—El-Tronics, Inc., Mayfield, Pa. (97F)

For further data on these up-to-the-minute machines, circle key number on Reader Service Card in back of book.



TYPE 430 STEEL (no nickel) turns in top performance in this potato chip machine. The special metal is employed here in the supply tank covers, side panels, salter, chip chute, vapor vent, and washing machine cover.



TYPE 201 STEEL (only 4% nickel) has been proved out in this bottle-filler bowl, which continues to give top service after 4 yr. on the line.

Don't Pass Up

LOW-NICKEL STAINLESS

You'll find that the lustrous, economical Type 200's—developed to conserve scarce nickel—rate as good as the celebrated "18-8." Thus they can handle many of the toughest jobs in the food field. And the Type 400's, too, have numerous pertinent applications

HAROLD RAPP
Assistant Editor, "Food Engineering"

TWO SERIES of steel alloys—the new 200's and the less familiar 400's—are now invading the food-equipment domain, once considered an exclusive field for the "18-8" (series 300) stainless metals.

In truth, these newcomers are not superior to the long-accepted 300's. But in many applications they can serve just as well—while costing the user a little less money and the manufacturer a lot less nickel. Also, the silvery luster of these low-nickel alloys is often considered a point in their favor.

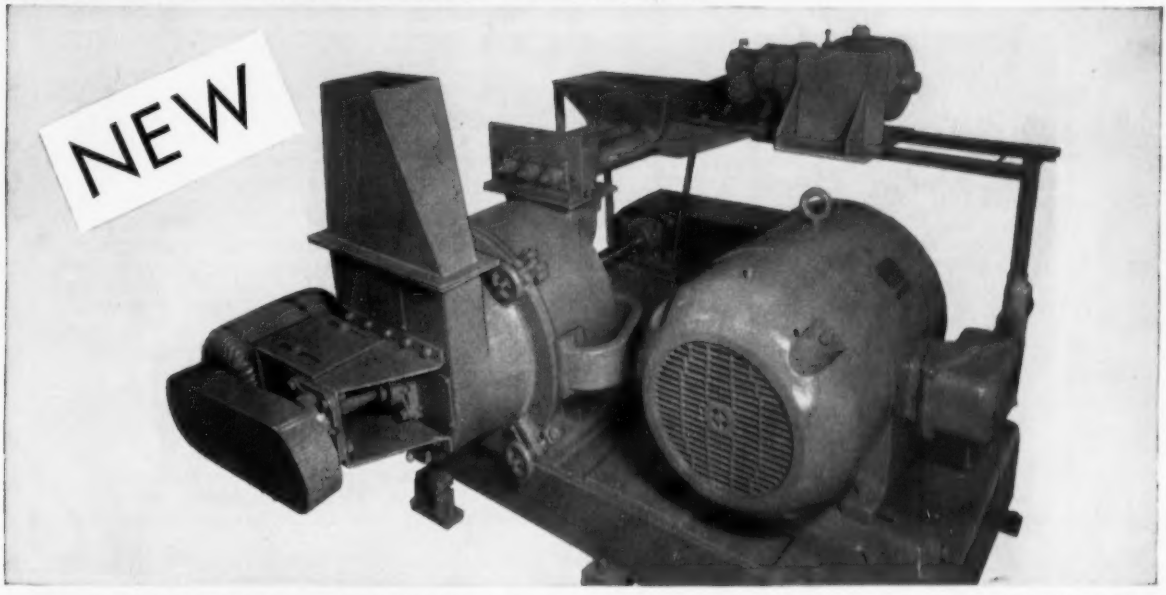
Rising interest in these alloys is seen in the variety of end-uses that they can be put to. The 200's have already proved suitable in such diverse units as syrup makeup tanks, beer barrels, work tables, cream separator disks, citrus juice tanks, and milk filler bowls. Further, they have stood up long years in truck trailers.

As for the 400's, they serve particularly well in making various cutting-edge units—their use in candy cutters and potato chip machines being noted. They are also employed in icing depositors and in numerous small container units. And they are further cited as particularly useful in the surface elements of conveyors and other working equipment.

Briefly, it's the scarcity of nickel for non-defense users that has brought the turn to the 200's and 400's. These low-nickel alloys conserve the low-supply metal, while assuring continued output of suitable stainless steels for the industry.

In an international emergency, the food field would get even less high-nickel steel. Another thing: Nickel was recently upped 9½¢ per lb. to help pay costs of mining new Canadian sources, and its price is seen going still higher.

Right now, interest is especially centered on the recently introduced Series 200 metals. After years of research, alloy metallurgists found ways of putting in more manganese while cutting down on the nickel—without loss of either strength or, in tests to date, corrosion resistance.



FOR PRECISION GRINDING AND CLASSIFYING IN ONE OPERATION

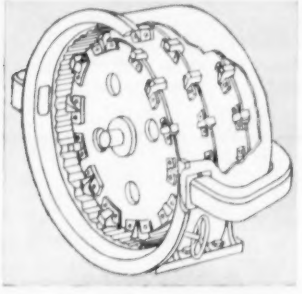
The PULVOCRON . . .
An Air Attrition Impact Pulverizer and Classifier with Controlled Radial Inward Air Classification.

Now in one compact unit you can have a pulverizer and a classifier plus an automatic feeder, with separate controls over each. This assures positive particle size control and high capacity over a wide range of products. The Pulvocron will produce particle sizes from a range of 99% less than 5 microns or as coarse as 50 mesh, depending on the material and desired results.

The grinding chamber contains three adjustable plates with twelve staggered beaters on each. It also features added versatility through interchangeable liners of corrugated, perforated or smooth finish, plus variable rotor stator clearances.

The Classifier unit is on a hinged section with quick-open locks for simplicity of operating adjustment or cleaning.

Material is both ground and classified through high centrifugal pressures set up by the beater and classifier plates. The Pulvocron is designed with oversize returns for automatic feed back of any oversize for further grinding.



Grinding chamber with adjustable plates, removable liners and oversize returns.

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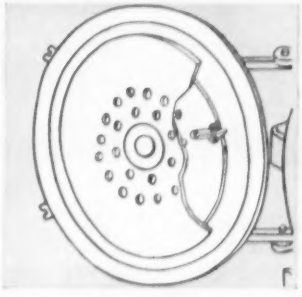
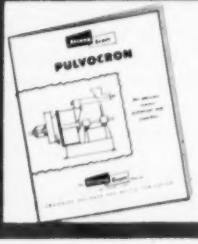


Classifier Unit with separate motor. Swings open as a hinged section with quick open locks.



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"Thumbnail" On the Stainless Steels . . .

PROPERTIES that have won stainless its important place in the food field are its smooth, durable surface and excellent corrosion resistance.

The alloying element imparting most of that resistance is chromium. There's at least 11.5% of it in every stainless.

Initially, such metals were the chromium-and-steel alloys. Then metallurgists found that addition of nickel gave a different kind of stainless—lighter in color, easier to fabricate, and with wider corrosion resistance. Resistance, in fact, to spare. This was the stainless called "18-8" (Series 300).

It became highly popular, users taking up the term "18-8" as a watchword for quality. And in the days of plenty of nickel, it came to be employed in many applications where, actually, less costly low-nickel grades would have been perfectly adequate.

The accompanying article gives you the facts on the latter metals—which today are on the rise because nickel is now in short supply.

Your use of these special, economical families of steels is well merited—since one kind (the new 200's) offers properties nearly identical to those of the conventional stainless, while the other (the 400's) can serve satisfactorily in a wide variety of less critical applications and are especially suited for cutting edges.

. . . And How to Get the Most Out of Units Made From Them

IF THEIR USE is abused, your stainless equipment—whether of the new or old type steels—won't live up to normal performance expectations. And, of course, initial selection of proper equipment, suitable modifications (where required), and correct installation are important prior considerations.

Design factors to look for when buying stainless units—

1. All couplings should be of similar metal. True, dissimilar ones are sometimes necessary, but they ought to be avoided if possible.

2. Joints should be welded, with crevices avoided. Gaskets and other materials contacting stainless should be of an impermeable material, not porous such as wood, rubber, or fiber.

3. Proper drainage is essential, with plugs located at the lowest points—thus avoiding moisture traps. There should be no sharp interior corners or dead angles.

4. The unit should have the highest possible finish (including all hard-to-polish spots) to promote resistance to corrosion.

5. Members should be free from unusual stresses, since those under excessive tensile stress are subject to cracking. Corrosion and pitting tend to abet such troubles.

In unit modifications—

1. Weld whenever possible. But if screws, bolts, and rivets must be used, be sure they are stainless. Remember, too, that drilled holes are better than punched holes.

2. Use welding techniques that minimize heat damage. And be sure to anneal afterward, except in the cases of low-carbon grade metals (where this is unnecessary).

3. Passivate (immerse or swab with nitric acid) to clean the surfaces and give them ultimate corrosion resistance.

When operating—

1. Avoid concentrated corroding agents, especially halogen ions. Gravity, evaporation, condensation, and temperature factors can bring about the menacing concentration. Agitation will help prevent them.

2. Oxygen levels of foods contacting stainless should preferably be high, or the factor eliminated, since intermediate levels tend to invite corrosion.

3. Employ lowest possible temperatures. And remember that quick temperature changes can cause warping.

4. Avoid low pH in contacting materials.

5. Consider the use of inhibitors (when they're permissible) to prevent corrosion.

6. Try to reduce any rubbing action (it can cause fretting).

7. Watch for spots that tend to become hardened by repeated impact—for such "worked" metals are sometimes vulnerable to pitting.

8. Where fluid is moving, allow some air to enter the system (whenever practical) to relieve low pressure areas (they cause cavitation).

9. Follow a routine of proper cleaning and maintenance (see FE Apr. '55, p. 78). Build-ups or deposits of materials should be avoiding by frequent and regular cleansing. Setup of units should be such that stainless parts are always accessible for proper cleaning.

Resulting are the 200's, containing around 4% nickel and 5 to 10% manganese, as compared with the 8 to 10% nickel and but 2% manganese in conventional Type 302 steels (see Table I).

Sheets of the 200 types are lower in cost—some $40 per ton less than their 300 series counterparts. While this saving in price might be thought trivial in terms of the final cost of a specific piece of stainless equipment, the difference will increase as nickel becomes more costly.

A word now about the 400's: A number of equipment fabricators have turned to Type 430 and its modifications. These contain little or no nickel. They have good (though not high) corrosion resistance, derived from their 17% chromium content. Their appearance is excellent, too. And as for price, sheets here run some $200 less a ton than Type 302.

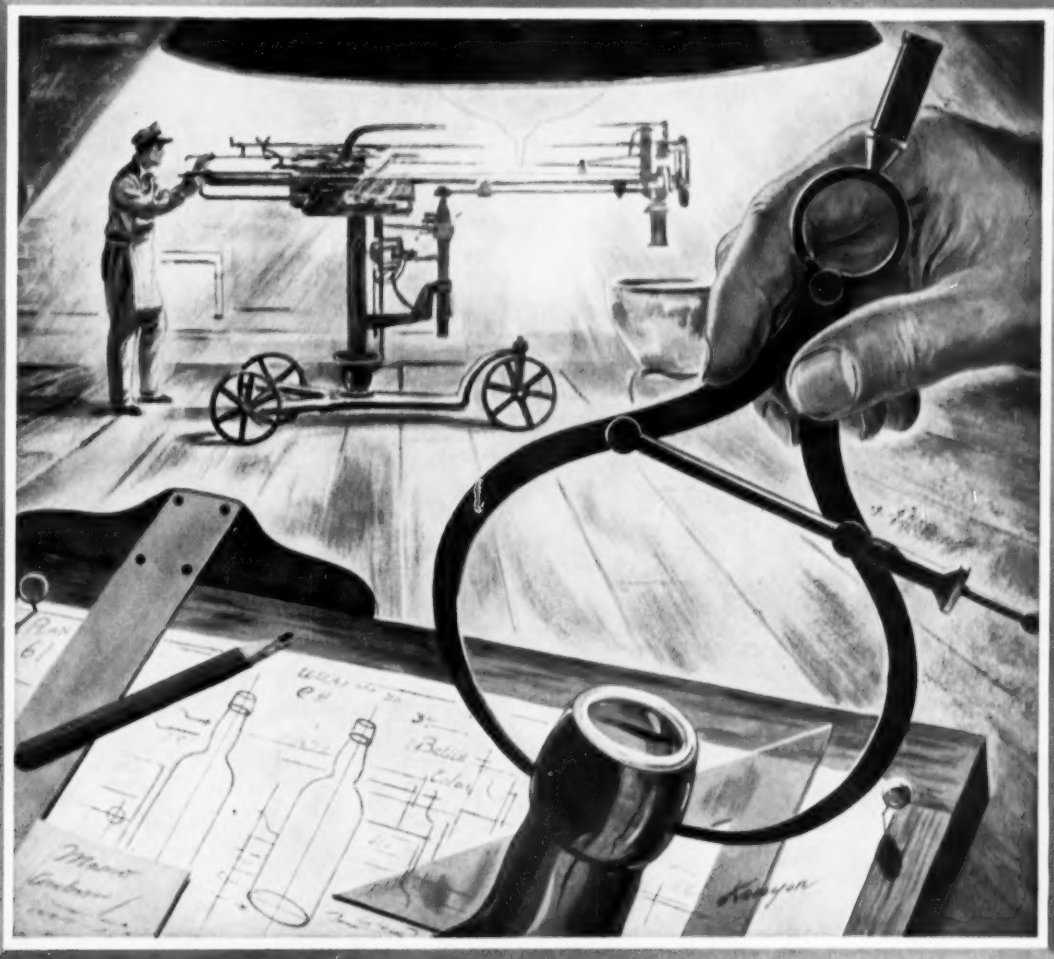
Focus on the 200's

Granted, no testimonial can surpass the long record of top performance, in almost every kind of application, of chromium-nickel stainless. However, indications are that Types 201 and 202 can replace Types 301 and 302 and do just as well. Only exception would be certain special cases where corrosion resistance has not yet been fully evaluated.

Specimens of 201, exposed for three years to severe industrial atmospheres, showed no significant corrosion. Moreover, appearance of the 200's after these tests was comparable to that of the 300's. Marine-atmosphere exposures yielded similar results.

Steel test strips (in composition representing the 200's) were suspended in brussels sprouts, apricots, and chicken giblets. And there was

SEVENTH ADVERTISEMENT OF A SERIES *"THE HISTORY OF GLASS CONTAINERS"*



1905

Introduction of semi-automatic bottle-making machinery, shortly after the turn of the century, did more to expand the glass container industry than all the achievements of the early years. With developments that soon followed, output was tremendously increased . . . and now supplied with containers of uniform weight and measure, packers could set precise production goals, and accurately estimate shipping costs.

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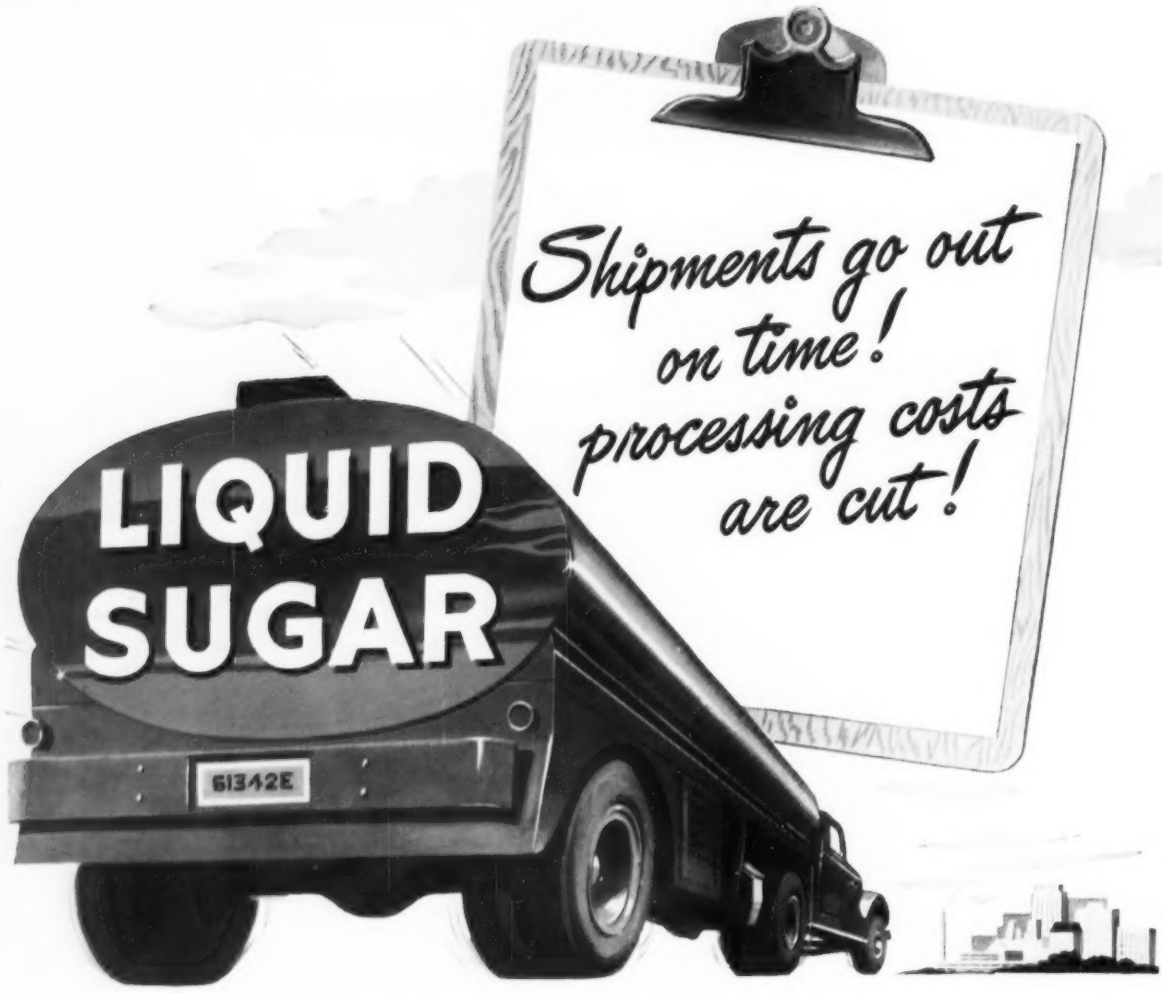
WASHINGTON, PA. JERSEY CITY, NEW JERSEY CHICAGO, ILL.



YOU SAVE both time and money when you clarify sugar liquors with Celite* diatomite filter aids. Save time because Celite filtration lets you combine P_2O_5 lime defecation, decolorization and clarification *all* in one operation (and insures you of outstanding color removal and brilliant clarity, too). Save money because you use your existing mixing tanks and filters and reduce decolorizing vegetable carbon consumption. In addition, in bone char refineries, char filter loads are also reduced when Celite filtration is used.

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For more information on how Celite filtration can save you time and money and give you better filtration results, call your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

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no staining of the strips after 3 hr. of boiling and standing overnight.

It will be seen (Table II) that in general the differences in corrosion resistance are small. In fact, it was found that in some test exposures (including those involving sulfurous acid and boiling lactic acid), the new alloys stood up better than did the 300's.

Mechanical strength of these manganese-containing steels usually equals or exceeds that of the 300's. Type 200 has been noted as superior in hardness, tensile strength, and ductility. But the 200's do have lower impact values (though they still may be termed excellent in this respect).

Fabrication of the new metals usually follows the same routine as with the 300's. The greater strength of the new metals entails a little more work in embossing, and their use may call for modifications in some forming operations.

Finishing procedures, including abrasive grit polishing, buffing, and flash plating, are reported easier and more economical.

Washington Steel Corp. is among those prominent in the work with these metals. It ran a survey covering end-use of some 225 tons of Types 201 and 202, much of it employed in food processing equipment. No bad reports on corrosion resistance came in, and much customer favor was noted relative to the luster of the metals.

Further, Allegheny Ludlum Steel Corp. produced a Type 202 bulk milk tank (200 gal.) for service at Penn State U. that may eventually lead to the popularity of such units. And it made the aforementioned cream separator disks (16% chromium, 4% nickel, 4% manganese).

Also, National Dairy Equipment Manufacturers' tests of experimental equipment made of Type 200 give preliminary indication that a 4% nickel alloy has real promise for use in dairy units should a change-over become necessary.

A most recent application of the low-nickel alloy has been in the special large shipboard tanks employed for transport of fresh orange juice (FE Mar., p. 142).

Since in most cases the performance factors of the conventional 300's actually exceed those necessary for given jobs, the 200's can be used safely to replace them. Certainly there can be no question of the adaptability of the new metals in uses where stainless is employed for attractive, sanitary appearance, while insuring easy cleaning and low maintenance. Such possible applications include panelboards, tank exteriors, and vat covers.

400's Spotlighted

Not to be used where higher corrosion resistance is required, the 400 series alloys, as stated, contain little or no nickel and about 17% chromium. It is only of late that they have come to be employed to replace the 300's in applications where corrosion is not a specific problem.

But despite the latter limiting factor, the 400's have found a wide variety of uses in the food field—as pointed out at the beginning of this article. And more uses are sure to be developed.

Future Aspects

Although nickel production is on the upswing, the day may soon come when there won't be enough to go around. Accordingly, considerable educating may be required to get the new stainless picture into proper focus.

Some states have laws limiting the composition (instead of performance) of steels used in food equipment. Hence, some laws may have to be changed.

It remains today that a number of food equipment makers continue to think of the Series 200 and 400 steels as "low-grade materials." And this view may be understandable, considering the many decades of satisfaction with the 300's. It is true, moreover, that there were some past misapplications of Type 430 stainless.

Even so, some equally qualified fabricators have found high suitability in the low-nickel and nickel-free steels. And they believe the 200's and 400's will prove to be their salvation in the event of complete absorption of nickel by defense groups.

Acknowledgement is made to International Nickel Co., Washington Steel Corp., Allegheny-Ludlum Steel Corp., "Steel" magazine, and the National Assn. of Dairy Equipment Manufacturers, for assistance in preparing this article.

Compositions & Resistances

TABLE I—FORMULATIONS OF THE ALLOYS are revealed here. Note nickel saving in Types 201, 202 and 430. High manganese in 200's help make them corrosion resistant.

Stainless Type	Nickel %	Manganese %	Chromium %
201	3.5–5.5	5.5–7.5	16–18
202	4.0–6.0	7.5–10.0	17–19
301	6.0–8.0	2.0 max.	16–18
302	8.0–10.0	2.0 max.	17–19
430	.....	1.0 max.	14–18

TABLE II—CORROSION RATES* under various exposures (conditions more severe than those normally encountered in food processing). Results show new metals parallel Type 304 in resistance.

Stainless Type	EXPOSURE							
	Nitric Acid	Boiling Glacial Acetic Acid		Sulfurous Acid		Boiling Phosphoric Acid, 10%	Oxalic Acid 10%, 200F	Boiling Lactic Acid, 50%
		Liquid	Vapor	Liquid	Vapor			
201	0.0016	0.00025	0.0004	0.0003	0.0004	Nil	0.0249	0.0379
	0.0016						0.0236	0.0347
202	0.0017	0.00021	0.0010	0.0002	0.0004	Nil	0.0243	0.0339
	0.0018						0.0227	0.0304
304	0.00087	0.00011	0.0004	0.0005	0.0007	Nil	0.0065	0.0804
	0.00085						0.0065	0.0976

* All readings are in inches of metal lost per month except under sulfurous acid, where readings are in grams lost per 28 days.

Experts Eagle-Eye Status and Future of—

5 Food-Preservation Techniques

Pointed evaluations of dehydrofreezing, dehydration, thermal processing, radiation, and chemical preservation highlight fact-finding sessions at Midwest Research Institute's Kansas City seminar

FE STAFF

JUST HOW FAR have our newer food-preservation sciences come today? And what further progress may be expected tomorrow?

To put sharper focus on the preservation picture, top-flight experts targeted the major procedures—dehydrofreezing, dehydration, and heat, "high energy," and chemical treatments—at Midwest Research Institute's recent Kansas City seminar.

First, the highlights:

Dehydrofreezing: Use in institutional trade and remanufacturing is seen as most imminent. . . . Techniques are further clarified for various fruits and vegetables. And trouble spots are identified. . . . Solids content is pinpointed as a criterion. . . . Bulk reductions run to 50%, with various handling savings. But need remains for more suitable moisture-removal equipment.

Dehydration: A greater variety of dehydrated foods is now feasible, thus broadening the field. But attainment of higher quality ratings remains vital. . . . Among the techniques, aqueous diffusion into a solvent holds special promise. And enzyme preparations can restore lost flavor. . . . Strides are cited in drying equipment. . . . Freeze-dehydrated meats have porosity offering favorable medium for use of tenderizers, opening way to better products from less expensive cuts.

Heat Methods: Adoption of improved HTST techniques is slowed by economic factors posed by seasonal-type operations. However, agitating retort cookers offer cost-balancing features. . . . Values are chalked up in HTST processing of whole kernel and cream-style corn, creamed soups, cream and milk, and some pureed vegetables. . . . Various good combination treatments have been demonstrated. . . . Further promise is shown in compartmentizing of formulated foods to provide complete meals.

"High Energy" (Irradiation): Effect of radiation on certain foods becomes clearer. . . . Role is seen played by irradiation in establishing food-processing areas at greater relative distances from cities served. . . . Cans are expected to be major carrier of rayed foods in any initial establishment of such procedures.

Chemical: Experimentation on further uses of antibiotics with foods holds wide promise. . . . Chemical protection of fats from rancidity is hailed. . . . Reducing agents stabilize red color in cured meats. . . . Progress has been made in chemical curbing of enzymatic blackening of shrimp.

Now to the details:

W. D. Ramage

DEHYDROFREEZING

W. D. Ramage, Western Utilization Research Branch, USDA, Albany, Calif., predicted that dehydrofreezing—partial dehydration and then freezing—of fruits and vegetables will likely play an increasingly noteworthy role.

Most promising immediate markets are with the institutional trade, also remanufacturing. Retail outlets will probably develop slowly.

Uniform size of particles is one of the important factors in uniform drying of products to be dehydrofrozen. For example, a reasonable amount of size-graded peas is necessary for more uniformity in moisture content of individual peas that are partially dried.

Adverse enzyme changes are prevented in dehydrofreezing by following procedures similar to those in conventional freezing. In most cases, it is necessary to

scald or blanch vegetables sufficiently to inactivate the enzyme peroxidase. Certain vegetables, like peppers and pimientos, can be dehydrofrozen without pre-treatment to prevent enzyme changes during storage.

Apples, apricots, and peaches that enzyme-brown when cut surfaces are exposed to air can be heated or chemically treated to prevent darkening. Soft fruits that further soften upon heating must be SO_2-treated.

Most items that lend themselves to dehydrofreezing can be partially dried to approximately 50% of fresh weight. This involves removal of "free" moisture. So the dryer operates exclusively under conditions where the moisture-removal rate is high.

There's no problem in freezing or packaging. In the case of vegetables, final temperature of partially dried materials is usually close to wet-bulb temperature of drying air (110-120F.). In normal handling, partially dried items are cool enough for packaging.

Drying to the extent employed in dehydrofreezing does not cause undesirable losses in nutritive value, provided proper dehydration procedures are followed.

Certain irreversible changes occur with some products during dehydrofreezing, and they adversely affect the processed product. Most troublesome is altering of cell-wall permeability, preventing proper rehydration. Such changes are most pronounced in onions, apricots, and Freestone peaches. They're slight in apples, peas, and carrots, provided dehydration is not carried too far.

Where dehydrofrozen products are intended to be cooked and served without delay, the desirability of rapid reconstitution naturally becomes a factor. This could have a bearing on determination of the amount of deyhdration in the processing. But for certain manufacturing uses, as in canned soups, rapid reconstitution is of little importance.

Solids Content a Key

Some indication of the amount of dehydration practical in dehydrofreezing can be obtained from the factor of solids content. Tomatoes and pimientos, which contain less than 10% solids, offer potentially greater savings through dehydrofreezing than do peas, corn, or lima beans (solids in excess of 20%). From an economical standpoint, it's doubtful that dehydrofreezing is favorable for items that can't be rapidly dehydrated to at least half their original weight without serious adverse effects.

Extent of concentration in dehydrofrozen products may be described in terms of total or soluble solids, or by ratio of weight of prepared raw material to finished product.

Most rapid procedure is based on use of a refractometer to determine soluble solids. This is reasonably precise in determining extent of dehydration when employed for apples, apricots, and carrots.

Determination of total solids by weighing residues is achieved by infra-red drying of samples. This method, though more broadly applicable, requires much more time than the refractometer method.

No extensive study of storage characteristics of dehydrofrozen foods has been undertaken. But observations indicate that the dehydrofrozens behave in much the same way as conventional frozen items. Storage at OF. is adequate for good quality retention. Temperatures that rise above OF. adversely affect quality, and so do temperatures that fluctuate.

More uniform drying can be attained by sparsely spreading material on belts or trays—but at the expense of drying capacity. Uniform drying can be achieved without loss of capacity when pieces of the products are continuously mixed during this process. This applies to peas, sliced apples, and diced items.

However, static drying on trays is the only available method for soft fruits. Commercial production of dehydrofrozen apricots is likely to be limited until a better drying method is developed.

Uniformity of raw materials and their piece sizes, also type of drying equipment, are most important

DEHYDROFROZENS SAVE SHIPPING WEIGHT. Comparisons of Approximate Scale Readings of Products (From 100 Lb. of Raw Material) Processed by Dehydrofreezing, Freezing, and Canning

Product	Assumed Prep. Loss (%)	Approximate Shipping Weight (Lb.)		
		Dehydrofrozen	Frozen	Canned
Carrots	20	43	86	120
Peas	5	51	102	156
Pimientos	40	23	64	70
Apples	33 1/3	36	82	79
Apricots	10	48	114	103

OTHER EXPENSES ARE CUT, TOO. Comparisons of Approximate Costs of Containers, Storage and Transportation of Dehydrofrozen, Frozen, and Canned Products (From 100 Lb. of Raw Material)*

	Dehydrofrozen				Frozen				Canned			
	Container	Storage	Transportation	Total	Container	Storage	Transportation	Total	Container	Storage	Transportation	Total
Carrots	$0.55	$0.55	$0.85	$1.95	$1.15	$1.10	$1.70	$3.95	$2.10	$0.50	$2.10	$4.70
Peas	0.65	0.65	1.05	2.35	1.35	1.30	2.05	4.70	2.45	0.60	2.55	5.60
Pimientos	0.30	0.30	0.45	1.05	0.85	0.85	1.25	2.95	1.20	0.30	1.10	2.60
Apples	0.50	0.50	0.75	1.75	1.10	1.05	1.65	3.80	1.20	0.30	1.25	2.75
Apricots	0.55	0.70	0.95	2.20	1.25	1.35	2.30	4.90	1.65	0.40	1.65	3.70

* Items stored 6 mo. and shipped from West Coast to Chicago.

factors in determining uniformity of moisture content of dehydrofrozen items. Broadly, the lack of suitable dehydration equipment has been one of the principal factors preventing more rapid exploitation of the advantages of dehydrofreezing.

Agitation during drying must be gentle to safeguard against damage to products. Best method is use of the through-flow type of dryer (see July FE '55, p. 43), in which the bed of material is continuously tumbled. Upward air flow is preferred because buoyancy thus imparted to products allows mixing with less damage than with downward air flow.

Comparatively high air temperatures are satisfactory with constant mixing. For example, drying of diced carrots to a 50% moisture level is safely carried out, in a through-flow dryer with continuous agitation, with employment of a 300F. air temperature. Most promising in this respect is a belt-trough dryer.

Economics of Dehydrofreezing

It costs about 1¢ to evaporate 1 lb. of water in an air-flow dryer using gas or oil. This represents ½¢ per lb. of single-strength product when 50% of the moisture is removed.

Freezing cost is relatively low in dehydrofreezing because of the reduced moisture content. Of course, the freezer must still be provided, so reduction in cost is not proportional to reduction in weight, unless custom freezing is used.

A 50% reduction in bulk gives the same reduction in container cost, provided the same size container is used. This savings is realized in institutional and remanufacture packs when large volumes of products are put up.

For most dehydrofrozen products, weight reduction is nearly proportional to amount of moisture removed. This means important savings in shipping expense (see Mr. Ramage's first table). There also are savings in costs of container storage and transportation (second table).

DEHYDRATION

M. C. Brockmann

From the standpoint of our Armed Services, dehydrated foods offer many advantages, either when employed alone or when combined into complete menus. So stated M. C. Brockmann Quartermaster Food & Container Institute, Chicago.

The dehydrated foods now include a greater variety of items for use under conditions where unemployment of perishable foods is not suitable or feasible. They also have long-term stability without refrigeration and, of course, decreased weight. And they enable use of simplified field-service equipment, while requiring less personnel for field preparation.

Full realization of these advantages is contingent upon the development of dehydrated foods with quality ratings equivalent to the canned products currently used.

A procedure which theoretically holds considerable potential for dehydrating food products is aqueous diffusion into a solvent or high salt concentration. Several patents covering solvent dehydration have been issued, but none is yet being exploited commercially.

Special enzyme preparations can restore the flavor lost as a result of blanching and dehydration. Most extensively studied example is a crude extract of mustard-seed which restores flavor to blanched, dehydrated cabbage. Enzymes are available commercially which are reported to liberate the flavor ingredient benzaldehyde from many species of the genus *Prunus*.

It is hoped that further research can reveal flavor release enzymes for many of the products which suffer serious flavor loss during dehydration.

Certain other undesirable changes can be avoided by special treatments prior to dehydration. For example, glucose oxidase removes a small amount of carbohydrate prior to dehydration and results in eggs of distinctly improved quality.

SO_2-treatment of apples has significantly decreased browning during and after dehydration. Calcium chloride has a similar effect on potatoes. Onions retain their ability to develop their characteristic odor, provided they are not dried at excessively high temperatures and are not blanched prior to drying.

A dryer having increasing commercial application for fluid products is the high vacuum drum or belt dryer, sometimes called a puff dryer (see FE Mar. '55, p. 71).

Product from this process has a very low bulk density, a factor generally associated with ease of rehydration. The process is commercially employed for preparation of dry citrus fruit and tomato juices, and it is under examination as a possibility for the production of dry whole milk.

Factor of Food Structure

Recent investigations have pointed to freeze-drying as the pertinent method for production of high quality dehydrated foods in which the preservation of structure is critical (see FE Sept. '54, p. 74).

On a purely practical side, advantages of freeze-drying raw meat are: (1) Dry product has excellent stability characteristics, and (2) it rapidly rehydrates to yield a product which is virtually indistinguishable from the fresh frozen item.

Freeze-drying of cooked meats yields similar results, except in the case of cured meats.

Low temperatures employed in freeze-drying, combined with the removal of water by sublimation instead of distillation, permit retention of volatile flavor components.

In addition to the large volume of vapor which must be removed, freeze-drying presents several other unique problems. Under ordinary conditions of freezing, most of the water present in the meat is converted to ice crystals. But a small percentage of the water remains as a concentrated solution of salts, proteins, and other materials. This solution resists freezing until the temperature falls below the eutectic point.

Presence of unfrozen moisture in apparently frozen meat has been troublesome. It sometimes gives rise to foam which drys on the surface of the meat as a glaze. This coating serves as a barrier to further vapor transmission, as well as adversely affecting rehydration.

Storage stability of freeze-dried meat is exceedingly sensitive to moisture. On storage at 100F., products with a moisture content of around 6% deteriorate

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markedly during 3 months. Flavor, texture, and appearance become distinctly less satisfactory. Also, the degree and rate of rehydration under standard conditions decreases, and evidence of browning appears. These changes are not observed when a product containing 2% or less water is stored under similar conditions.

No significant loss of vitamins takes place during dehydration of beef steak and pork chops. However, losses of 20 to 40% of riboflavin, 20% of nicotinic acid, and up to 50% thiamine have been observed during 12 months' storage at a high temperature.

On the basis of available information, freeze-drying is well suited to all types of mammalian meat, poultry, and fish and seafood. Results with milk and eggs, also oysters, have fallen short of expectations.

In the field of plant products, a wide assortment of fruits and vegetables such as bananas, apples, strawberries, and peaches have been freeze-dried with excellent results, although several products require special pre-treatments or unusually low processing temperatures during the actual freeze-drying period.

Freeze-dehydrated meat, by virtue of its porous structure, presents an excellent medium for the use of tenderizers. By adding tenderizers to rehydration water, deep penetration can be achieved into the structures of the meat. This treatment for producing more tender meats can mean better products from less expensive cuts.

HEAT PRESERVATION

L. E. Clifcorn

Developments in HTST processes (high-temperature, short-time) to enhance quality and nutritive value of canned foods were cited by L. E. Clifcorn, American Can Co., Barrington, Ill.

There are, however, economic factors slowing the commercial implementation of improved HTST techniques in the canning field. A vegetable canner's capital must be amortized on a 4-to-6-weeks-per-year operation. In most cases, economics are worked out so closely that seasonal packers can't afford to purchase the more expensive equipment.

That's why the lower-cost synchronized batch-type agitating retort cookers may be more in line, pocketbook-wise, for seasonal canners, rather than the more expensive automatic units.

Some products, like peas of higher sieve sizes and maturities, are not materially improved by high-short processes. A certain amount of cooking heat is needed.

With many products, too, improved quality attained by these processes dissipate rapidly during regular temperature storage. Fruits are not bettered enough to justify the additional cost of the equipment.

However, whole kernel and cream-style corn, creamed soups, cream, whole milk, and some pureed vegetables respond very favorably.

High-short processes offer a means to obtain the delicate balance required to arrive at optimum time and temperature—that is, to: (1) Sterilize a product, (2) destroy enzymes causing storage deterioration, (3) cook products to most desirable texture, and (4) improve flavor, color, and nutritive value.

Mr. Clifcorn pointed out such possible combination processes as—

1. Storing freshly canned items at 32-36F. to retain highly acceptable quality for over a year.
2. Using antibiotics along with thermal processing.
3. Employing mild radiation (to materially lower heat resistance of *Cl. botulium*) along with mild heat.
4. Using mild heat treatment and refrigeration (or freezing). This process is now employed for many heat-sensitive products, and will expand in the future.
5. Dehydro-canning of apples and cherries (already successfully demonstrated).

There are attempts to compartmentize constituents of some formulated foods, and give components special heat treatment prior to packing them in cans. Formulated complete meals in cans may thus be possible.

"HIGH ENERGY" TECHNIQUES

B. H. Morgan

B. H. Morgan, Quartermaster Food & Container Institute, Chicago, declared that radiation preservation is now due for a "long, hard look" by the food industry.

Said Mr. Morgan: No longer can irradiation be considered just a dream. Rather, having passed its infancy, it now deserves the thoughtful and active participation of food-industry managements in determining if it has a place in treating their specific products.

What's more, the industry cannot ignore the logic of carrying on a continuing re-evaluation of the potential of radiation preservation. For there is convincing evidence that, in the not too distant future, radiation will play a worthy role along with other means of food preservation.

Findings Cited

Especially interesting were these examples of the effect of radiation on certain foods:

Carotenoids in oil are broken down, whereas those in water are not.

Color changes take place when pectins and dextrins are given a 2-million rep dose.

A 6% sugar solution shows a pH drop to the 3-range.

Irradiated wet proteins gel. If dry, they decrease in viscosity and increase in solubility.

Trend is toward extension of food production into areas more distant from the cities served. Here's where irradiation of fresh produce, for example, may play a future role. This would be true, of course, where shelf-life can be extended an additional 5 to 7 days by the treatment (also taking refrigeration into consideration).

Indications are that foods to be sterilized by radiation will first go into cans, rather than other types of

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CHEMICAL METHODS

Hugh L. A. Tarr

Only in comparatively recent years has real progress been won in chemical preservation of foods, according to Hugh L. A. Tarr, Fisheries Research Board of Canada Technological Station, Vancouver, B. C.

Pointing to the greater safety in consumption of foods properly preserved, he holds that numerous new possibilities may be revealed by experimentation in uses of antibiotics.

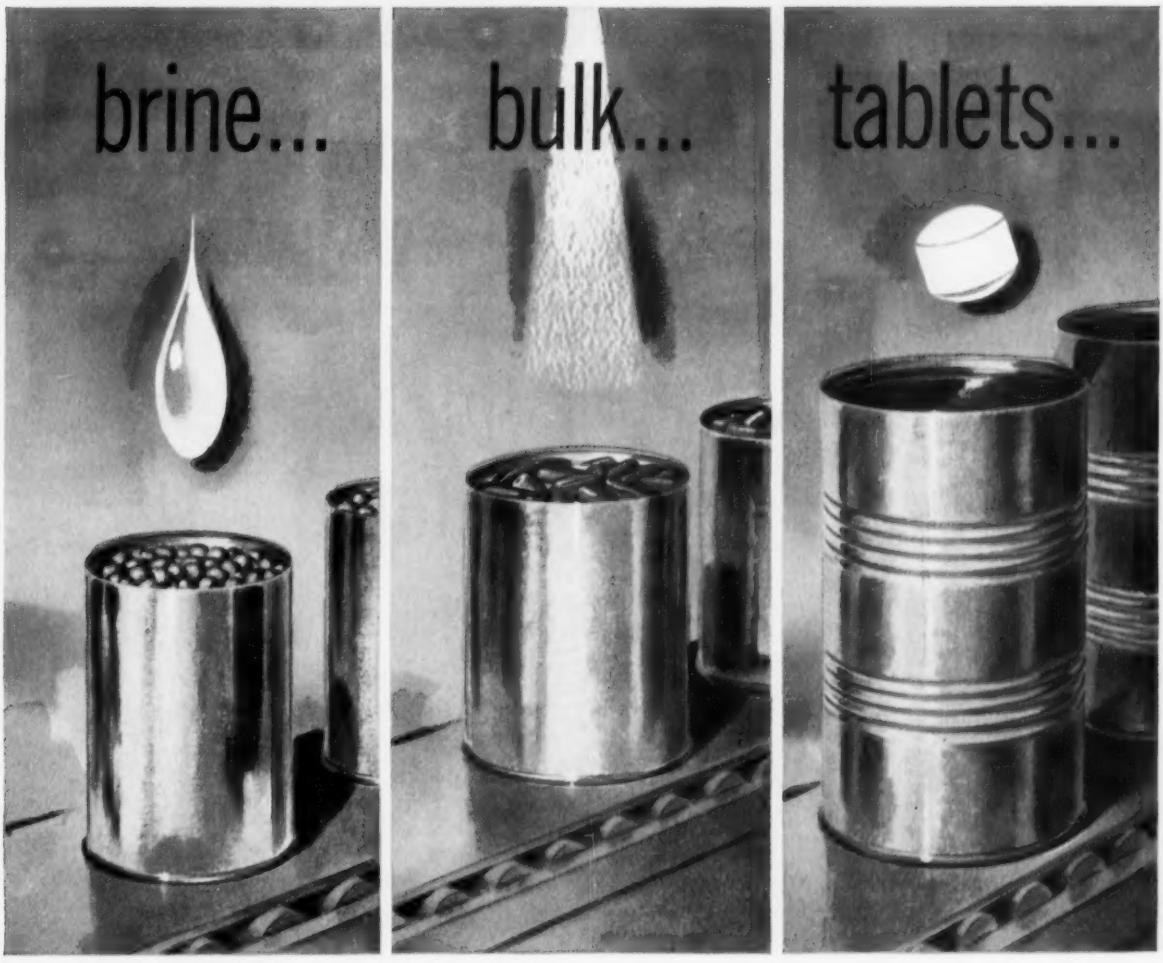
One of the most interesting and fruitful uses of chemicals in foods has been the protection of fats from oxidative rancidity.

Another development is stabilization of red color of cured meats with certain reducing agents. Inclusion of ascorbic acid in cured meats reduces nitrite ions to nitric oxide, which reacts with reduced myoglobin to yield nitric oxide myoglobin.

At least partially solved is the enzymatic blackening (melanogenesis) of shrimp. Most effective way of retarding this condition is by storing shrimp in ice containing 0.10-0.15% sodium bisulfite. With shrimp, ice containing CTC (chlortehacycline) is not as effective as with fish.

We can visualize, said Mr. Tarr, a great future for research in chemical preservation. And here the general method rarely requires either extensive equipment or skilled operators.

"It's the best catsup you can buy—and see how easy it flows from the bottle!"



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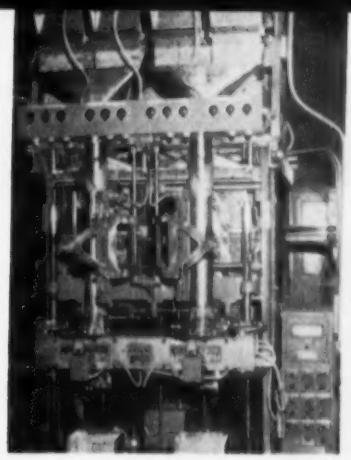


BAGGED pre-sliced potatoes (above) come off fully automatic Hayssen unit (top) at a fast 40-a-min. clip. Roll-fed polyethylene stock is specially printed by Wrapture, Inc., Flushing, N. Y.

FE STAFF

THERE'S NEW PROOF every day that you can "cash in on convenience" with your staple foods just as well as with your up-priced specialties.

Take fresh sliced potatoes all ready for French frying. Eastern National Foods, Inc., though only newly established at Riverhead, Long Island, N. Y., is already making a solid profit with this handy item. Despite the fact that there has been little promotion of these "fries," housewives are snapping them up.

Eastern's solution of the shelf-life problem did the trick.

Such ready-to-cook potatoes, true enough, have long been popular with the institutional trade. But this new operation represents a pioneering in the consumer market.

Buy-appeal is offered by the following features:

1. Product is visible through polyethylene bag.

2. Shelf-life (refrigerated) of ten days is guaranteed, and product will last a month if kept properly.

3. A smattering of creative kitchen work is left for the Mrs.

4. Package has imprinted directions for preparation.

Tracing Product Through Plant

Only selected, high-quality, dense potatoes are used, because these absorb less oil in frying, stay crisper on the outside and firmer in the center, and insure an even golden-brown color.

The spuds enter the plant on an elevated conveyor that dumps directly into a lye peeler, or they come in bags and are then palleted and brought to the peeler on fork-trucks.

After passing through the caustic solution, skins are removed in a washer-scrubber. Caustic peeling was preferred for this process because it resulted in a minimum of waste, offered continuous flow, and required less hand labor afterward.

Washing in a rotating drum follows, and product is then carried up a woven-wire belt to the peeling table. Here the potatoes continue to be loop-conveyed until the girls have divested all eyes. Trimmed product is placed on a central conveyor for transfer to an Urschel slicer. Slices subsequently are elevated to a preservative tank.

Employed here is a special additive mixture that includes ascorbic acid and sodium bisulfite. The company had initially attained a two-day shelf-life for its potatoes, but this new treatment has extended the keeping time well beyond that—making the new product practical.

Treated pieces pass through a rotating reel that allows undersize slivers to pass through. A cleated wire belt brings the bite-size wedges to a rubber belt equipped with four scraping attachments. These each comprise a number of stainless paddles mounted to move across the line of motion of the belt and thus scrape product off.

One Can Feed Four

In this manner four separate packaging machines may be fed from one production line. Carried by a cleated belt into the vibrating hopper of the packager (Hayssen), the pieces wiggle onto the platform of a pre-set scale—actually one blade of a four-vaned paddle wheel.

The wheel turns, dumping its load of potatoes, when the right load accumulates on the dumping blade.

Roll-fed polyethylene (selected for its low rate of moisture vapor transmission) is used to bag the slices. The weighed product feeds into a stainless tube, around which film is drawn. The film is then heat-sealed along the side.

Next, a transverse sealing forms the bag bottom, and finally another transverse sealing closes off top of the bag, enclosing the potatoes and simultaneously forming the bottom of the next bag. A knife then separates the bags.

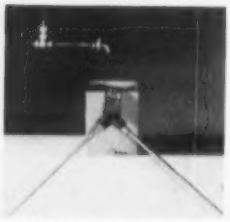
An electric eye register assures uniformity of the printing on each bag unit. And accurate control of sealing temperature is insured by a Wheelco Capacitrol unit. Desired temperature is set on a scale, and a moving pointer keeps a constant check on the actual temperature.

The packager fills up to 40 bags (1-lb.) per min.

Filled bags are conveyed to a plywood turntable, where they are hand-packed into corrugated cartons.

Eastern is educating storekeepers in proper handling to achieve top shelf-life. Product must be kept under refrigeration. And FIFO (first in, first out) retailing is advised.

Three ways to lubricate and clean conveyor chains—*while they run!*



Oakite Chain Lubricator
Water feeds into top of this unit, dissolves jelly-like Oakite Composition No. 6. Solution then drips on conveyor surfaces.

Oakite Roller Lubricator
For use with Oakite Composition No. 6, a soapy cleaner-lubricant, or with Oakite No. 12, a non-soapy lubricant. Conveyor chain powers the roller.

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Tighter Control of Food Products Planned by FDA

Bigger budget will finance more field inspections and laboratory tests and research

LOOK FOR a significant increase in the activity of the Food & Drug Administration. The agency appears certain of winning a $1,327,000 boost in enforcement funds. This is enough to expand FDA's Washington and field staff by 16%—and to add 162 new positions.

Here are the major food programs in line for new or increased attention in fiscal year 1958:

- Analysis of precooked and prepackaged foods, seafood, and poultry. Here a "high priority" will be assigned.
- Drawing up official processed food standards. This program was halted in recent budget-cutting years.
- More attention to frauds and other "economic" violations.
- An 18% expansion in factory and warehouse inspections. Fifty more inspectors are being hired.
- Field inspections to improve enforcement of the pesticide law. FDA will hold a symposium for operating chemists—including those employed by state and local health agencies—on methods of detecting agricultural poisons and chemicals in foods.
- Investigations of spray residue and chemical additive effects. Scientific studies will be stepped up on new, as well as older, ingredients—whether added to food intentionally or inadvertently.
- Investigation of decomposition in foods. The recently launched project to look into contamination and spoilage of fresh and frozen poultry, frozen citrus fruits, precooked foods, and the like, will be further expanded.
- Expand work on nutritional adequacy. This activity will involve:

1. Testing claims that specific amino acids as food supplements will improve protein quality of foods;
2. Studying effects of heat and irradiation processing.
3. Investigating changes in fats subjected to high temperatures.
4. Studying the effects of emulsifying agents in human nutrition.

- Industry and consumer education programs will be launched in an organized, coordinated manner.

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- tear strength
- toughness

Some people have come to regard all polyethylenes as pretty much the same material. However, there are important differences in molecular structure which make one polyethylene vastly different from another. For example, one polyethylene resin formulation may be just right for use as film to package products such as potatoes, and yet be completely unsuitable for use as a molded container to package ice cream. Du Pont has developed a family of polyethylene resins, each compounded to suit a particular range of needs.

Basically three factors must be considered in order to define a specific polyethylene resin; these are Melt Index, Density and Molecular Weight Distribution. Melt index is a measure of fluidity ("soupiness") of the molten plastic under specified conditions. High melt index means that the molten plastic flows readily, whereas low melt index means it is stiffer in the melt—rather like molasses in January.

Density, or specific gravity, is a convenient measure of the extent to which the resin has crystallized. A higher degree of crystallinity means increased stiffness, higher yield point, greater resistance to cold flow or "creep." A lower degree of crystallinity means greater flexibility, resistance to flex fatigue and resistance to impact.

Molecular weight distribution refers to the uniformity of sizes of the polyethylene molecules. A polyethylene with a wide distribution of molecular sizes exhibits different properties than one with narrow distribution.

Now, it is by controlling these factors... Melt Index, Density and Molecular Weight Distribution... that polyethylenes can be made with properties specially suited to individual packaging applications.

For example, if stiffness is required, a resin of high density should be used, since as the density is increased, the stiffness increases. ALATHON 34 and 37 have been formulated in this manner. They have a density of 0.930 grams per cubic centimeter at 230° C., which represents one of the highest densities available in commercial "non-linear" polyethylenes.

Permeability, also, is determined by the density of the material. When the polyethylene molecules are densely packed, liquids or gases have a hard time getting through them. Consequently, we can expect that polyethylenes of higher density will have greater impermeability to moisture and oils than those of lower density. Here again a special formulation of ALATHON (ALATHON 34) has proven exceptionally well suited for use in coating paper because of its critical grease-resistant properties.

Several factors influence the tear strength of polyethylenes. Tear strength of polyethylene may be improved by using a resin with high density or by using a resin with a low melt index. Compositions of ALATHON manufactured in this way have outstanding tear resistance. (ALATHON 34 – Graves test)

To make a polyethylene film which has good impact toughness, a resin with a low density, low melt index and narrow molecular weight would be best. Film made from ALATHON 14 or 22 has the right combination to give tougher, more durable packaging for such heavy items as apples and potatoes.

Whatever your packaging needs, there is an ALATHON polyethylene resin specially formulated to fit your requirements. For more information, clip and mail the coupon.

TABLE OF ALATHON POLYETHYLENE RESINS

ALATHON (formulation number)	Melt Index	Density (gms./c.c.)	Molecular Weight Distribution
ALATHON 10, 10A	2.1	0.923	13
12	2.1	0.918	20
14	1.8	0.914	40
16, 16A	4.0	0.923	15
17	20.0	0.923	11
20	2.0	0.920	8
22, 22A	3.0	0.921	7
34, 34A	3.0	0.930	8
37	12.0	0.930	8

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E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 265, Du Pont Building, Wilmington 98, Delaware.

Please send me complete information on Du Pont ALATHON polyethylene resins. I am interested in evaluating these materials for

Name _____ *Position* _____

Firm Name _____

Street Address _____

City _____ *State* _____

Type of Business _____

In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec

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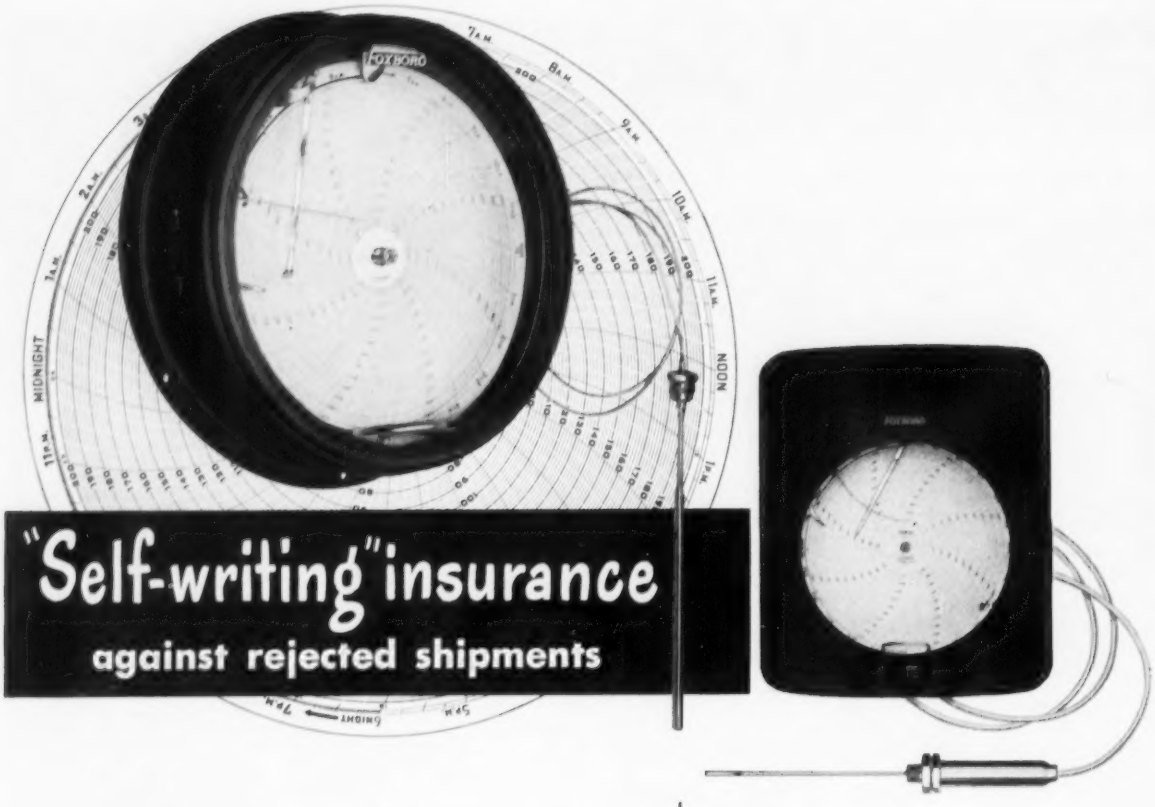

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A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

Can We Afford a $71.8 Billion Budget?

THE BUDGET submitted to Congress by President Eisenhower for the year beginning July 1 proposes federal spending of $71.8 billion. In only four years, three during World War II and one during the Korean War, has the government spent more. Under the proposed budget the government expects to collect $73.6 billion, mostly through individual and corporation income taxes.†

The principal reason for the size of the budget and for this year's increase is an expanding defense program. About 60% of all budget expenditures in the coming fiscal year will be for national security programs. Moreover, this area accounts for about 90% of the proposed increase in federal spending. In addition, as the chart shows, there are large expenditures proposed for purposes other than defense.

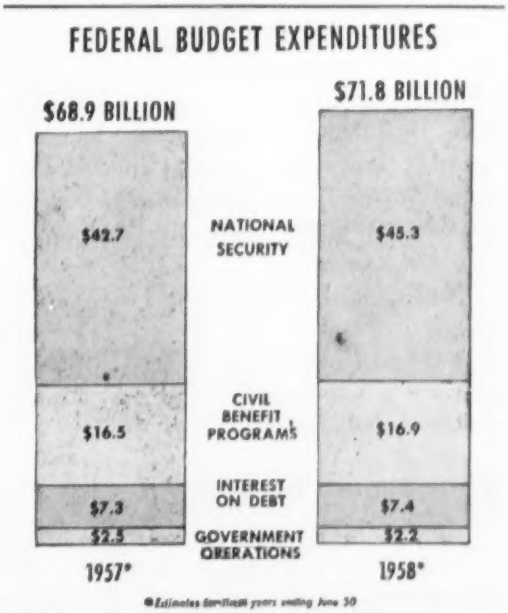
Continued budgets of this size, some contend, will lead to inflation and wreck our economy. It has been suggested that they might lead to "a depression that will curl your hair." Yet many insist that the budget, large as it is, still is inadequate in many respects — for defense, schools, agriculture, small business, health, research, indeed, for almost every activity in which the government has become involved.

Is It Really Too Big?

Actually, the proposed budget would place no greater burden on the economy than any budget in the last six years, because our economy has been growing. Federal spending per capita under the proposed budget will be about $416, or $10 more than this year; but our per capita income rose almost $80 last year. And, because of our increasing population, next year's expenditures will, in fact, amount to *less* per capita than in 1954 when federal spending was $4 billion lower.

Another way of measuring the burden of government expenditures on the economy is to compare the purchases of goods and services of all branches of government — federal, state and local — with the total output of the nation. The share of our national product taken by government this year will be about the same as in the past two years and, furthermore, about the same as the average for the past 28 years.

By the standard of any recent year, the budget is within the means of the American economy. In this sense, we can "afford" it. But the pros-



†*These figures refer to the regular federal budget and do not include operations of trust funds, primarily for social security programs and the new federal aid program for highways, which are financed by special taxes.*

pect of steadily increasing budgets, requiring 20% or more of our national income, introduces another threat.

The Real Threat

Large and rising budgets that do not balance government spending with higher tax collections clearly would be inflationary and would destroy the value of the savings and income of all who lagged in the race with climbing prices. But serious dangers will still exist even if our budget continues to be balanced, as this year's is.

- **Budgets that require a large take in taxes eat up the savings required to finance private industry.** What the taxpayers must give the government they cannot save. This deprives private industry of the savings and resources needed to expand and modernize producing facilities.
- **High tax rates also undermine the incentive to save and invest in normal business enterprises by taking such a large share of any income gained.** Taxes on corporation income now take 52% of all income over $25,000. And taxes on individual incomes can take as much as 90% of earnings that remain after this 52% bite.
- **High taxes encourage, on the part of both individuals and corporations, the search for "gimmicks" and special treatment.** As a leading character in Cameron Hawley's novel *Executive Suite* observed: "To a far greater degree than most people realize, income tax has become a primary governing factor in corporation management." Indeed, it is only because of the numerous gimmicks and special provisions now available that high tax rates have not already inflicted greater damage to economic incentives.

These dangers comprise the real threat of large and rising federal budgets. It is a threat to continued growth of our economy, and it is no less a threat merely because the budget is technically in balance.

What Should Be Done?

In attempting to hold government spending within reasonable bounds, we should *not* hold back on needed civilian programs. The heavy demands now being urged at all levels of government for roads and schools, for instance, are largely the result of failure to keep pace with the growth of the country. Furthermore, we cannot cut provisions for national security below the minimum level of safety. And unhappily, defense in the rocket and missile age is fantastically and ever increasingly expensive.

What we *can* do is enforce some financial discipline on our military leaders, and hold down our defense expenditures by making sure their demands are justified and by requiring efficiency. In the civilian programs, though some need to be increased to serve a growing economy, we can eliminate the outright waste.

A More Difficult Job

We must also do something far more difficult, and that is to reduce federal programs of aid to special groups at the expense of all the taxpayers. The new budget calls for over $5 billion for veterans, and another $5 billion for farmers. A number of industries and areas stand to receive aid in large amounts based less on necessity than on political pressure. These demands for increased aid, year after year, must be resisted if we are to have any hope of stopping a relentless rise in our budget.

Then, as our national income increases, we can look forward to reducing tax rates and providing greater incentives for the private sector of the economy. **Only in this way — by keeping government spending in line with economic growth — can we prevent our federal budget from being a crippling burden.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

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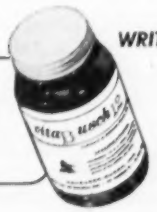

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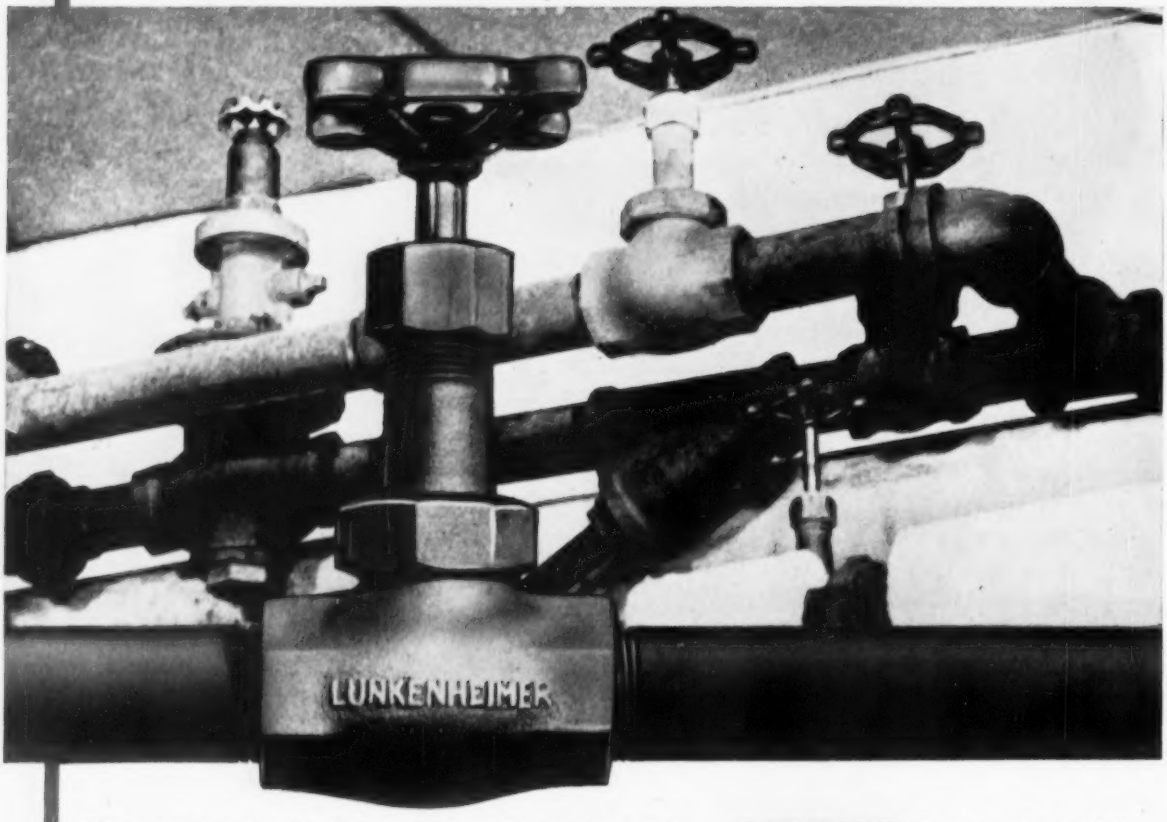
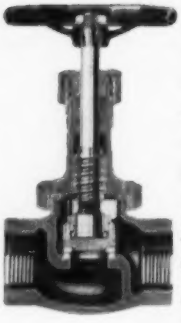
The cost of a LUNKENHEIMER VALVE *Gets smaller... and smaller... and smaller...* with each passing year of dependable service.



The price you pay for the average valve represents only a fraction of its total cost. Every time a valve requires repair, more and more of your precious maintenance dollars are drained away. With today's high labor costs, it takes only one or two repair jobs to spiral maintenance expense up to a point many times higher than the original price of the valve. That's why it always pays to install the best valves your money can buy. When you insist on the extra margin of good workmanship and quality materials that go into Lunkenheimer Valves, you get your investment back many times over in trouble-free, maintenance-free service. The Lunkenheimer Company, Cincinnati 14, Ohio.



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KEEPING UP WITH THE FIELD

Canada OK's Antibiotic on Fish

Treatment of fresh fish with the antibiotic Aureomycin won an official OK recently from Canadian food and drug men. First plant to market the protected product, according to American Cyanamid Co. officials, was National Sea Products, Lunenberg, Nova Scotia. The process is expected to dramatically cut the $23,000,000 worth of fish which annually spoil before reaching the consumer in the maple leaf country.

British Find 'Phage' Control

Ultramicroscopic organisms—termed "Phage"—that attack the desirable acid-producing bacteria in cheese starter cultures can now be controlled with a milk derivative developed by a British firm, Fisons Milk Products Ltd.

The compound, a white spray-dried powder reconstituted in a 10% solution with distilled water for use, is free of calcium—which is a prime requisite for growth of the injurious organisms.

Predicts Bumper Sugar Crop

If weather conditions remain favorable, Cuban sugar production will exceed the decreed output of 5,150,000 Spanish long tons, declares B. W. Dyer & Co., New York brokers and sugar economists.

Even before the present stretch of good weather, reliable sources estimated Cuban output for '57 at 5,250,000 to 5,350,000 long tons, adds the company.

Beef, Pork Colors and Tenderizers Probed by AMI Speakers

Development of better meat quality was the overriding theme at the recent American Meat Institute Research Conference, Chicago. Under particular probe were the problems of dark beef, tenderizers, and pork color.

Here are pertinent abstracts:

Dark Beef: Injection of hydrocortisone into beef cattle prior to periods of excitement or stress can alleviate the physiological conditions that result in the slaughtered meat having a dark color, declared H. B. Hedrick, U. of Missouri. Stress arouses the animal's sympathetic nervous system, explained the researcher, which stimulates the secretion of adrenaline. This hormone mobilizes blood glucose at the expense of tissue glycogen.

Recovery from this condition depends on the intensity and duration of the stress, but can be speeded by the hydrocortisone.

Tenderizers: Meat tissues can be softened by any of the tenderizing enzymes, provided the right amount of enzyme evenly penetrates the tissues, asserts H. Wang, American Meat Institute Foundation.

He reported on twelve preparations that have been studied to determine their mode of operation. They are broadly classified into enzymes of bacterial or fungal origin that act on muscle-fibre protein, those that primarily attack muscle fibre and act slightly on collagen, enzymes which degrade connective tissue (collagen and elastin), and two pancreatic preparations that have a trace of elastase activity.

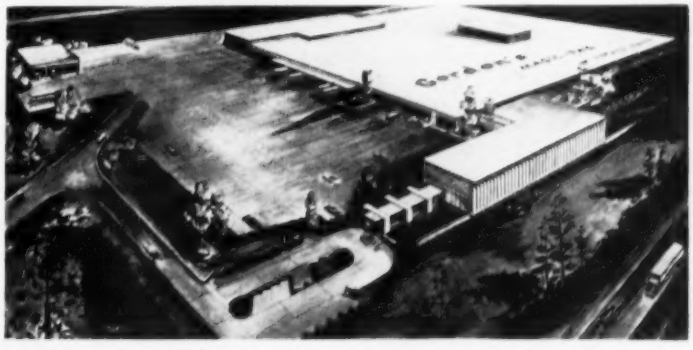
Overlapping action of enzymes appears to be the rule rather than the exception, noted Mr. Wang.

Pork color: Maximum protection for color of cured pork meat can be attained through addition of reducing agents, copper complexes, and polyphosphates to the curing solution, reported B. M. Watts, Florida State U.

For, the desirable pink color is destroyed by 1. a reversible conversion of the pigment to brown hemichromogen, and 2. an irreversible decomposition into porphyrin-ring split products (green to gray in color).

The first reaction is hastened by light, and inhibited by reducing agents, the scientist insisted. The second chemical breakdown is associated with bacterial peroxide production and from atmospheric oxidation of unsaturated fats.

Both of these dilemmas can be retarded by polyphosphates.



New Bakery and Chip Plant for Atlanta Area

Construction is expected to start soon on this 180,000 sq. ft. bakery and potato chip plant in Atlanta, Ga. Designed for Gordon Foods, Inc., a division of Sunshine Biscuits, Inc., the giant new facility will cost an estimated $3,000,000 when fully equipped. The one-story structure will have a concrete base, steel framing, and cavity walls. Roof of the plant is to be "ponded," and will hold 100,000 gal. of water. Evaporation from this "lake" will materially aid in air conditioning.

Tests Coin-Operated Cafeteria

Newest entrant in the race to develop multi-item vending machines is this automatic cafeteria, designed to supply complete meals to in-plant workers. Now being test-marketed by the manufacturer, Rudd-Melikian, Inc., Hatboro, Pa., the machine consists of three units that handle hot plates, hot cans, and pastries, respectively. The precooked foods are held at 32F. until meal times, then heated for serving.

Senate Passes Poultry Bill Sends Measure to House

The Senate has passed and sent to the House a compromise bill requiring Federal inspection of all poultry moving in interstate commerce—and in some intrastate sales.

Under this bill, the government will pay the full cost of the mandatory inspection (estimated at $10,000,000 annually) relieving poultry men of $2,500,000 in payments now going for voluntary service supplied by USDA.

The bill provides for bird-by-bird post-mortem inspection—as well as ante-mortem inspection at the processing plant (on less than a bird-by-bird basis). While limiting compulsory inspection to the actual processing plant, the poultry bill does go beyond the 51-year-old Meat Inspection Act in several ways: It spells out the required level of plant sanitation, packaging, and other requirements, and authorizes USDA—after hearings with local or state inspection agencies—to require inspection of all poultry marketed in major consuming areas regardless of whether or not it moves across state lines.

Cuts Ice Cream Carton Costs

Simplification of ice cream packaging for lower cost and cleaner design has taken a step forward with approval of a new carton marking system by the Chicago Board of Health, announces the Paraffined Carton Research Council.

Many state and city governments require individual plant addresses to be printed on cartons—a costly feature for multi-plant companies.

The new Chicago ruling, however, permits the main company address to be printed with the branch plant indicated by an embossed code, applied with a filling machine attachment devised by Anderson Bros. Mfg. Co., Rockford, Ill.

More Automation Needed

Labor saving devices have increased the dairy worker's productivity 2.2% over the past five years—but with the present pattern of union contracts, this efficiency must be boosted 5% in '57 alone to break even, asserts R. J. Speirs, president, Abbotts Dairies, Inc., Philadelphia.

What is needed in automatic equipment is control, he continues, particularly in CIP units. Devices so dependable that public health and plant men need never give them a thought.

Quality Loss in Frozen Juice

Quality of frozen orange concentrate is suffering from present distribution and retailing practices, an expert charged at a recent Florida Citrus Commission meeting.

Nearly all of 1,408 samples of frozen concentrates purchased throughout the country showed deterioration in flavor when compared with test reports made on the identical batch at production time, declared Lamar English of USDA's AMS. About 12.6% of the samples had deteriorated to the point where they would now be classified as Grade B. Another 6.6% would be graded Sub-Standard.

U. S. Diet Up Over 1900

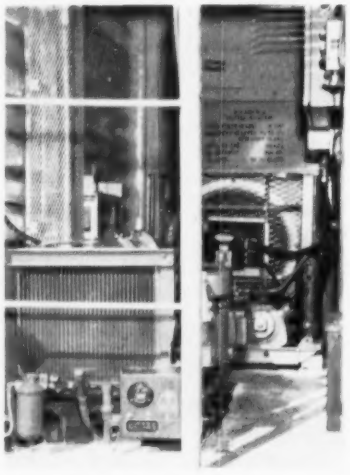
Despite the fact that average caloric intake has dropped in this country since 1900—3,200 calories today as against 3,490 calories then—the American diet has steadily improved, declares Dr. Hazel K. Stiebeling, director of USDA's Institute of Home Economics.

Dr. Stiebeling attributes this improvement to decreased consumption of high calory foods (such as potatoes and cereal products), and increased use of products such as eggs, milk, meat, poultry, fish, green and yellow vegetables, and citrus fruits.

Mrak Wins Appert Award

An annual award for outstanding accomplishment in food technology—The Nicholas Appert Medal—has been won this year by Dr. Emil M. Mrak, U. of California, Davis.

The Chicago Section of the Institute of Food Technologists made the presentation, as FE went to press, at the annual IFT meeting in Pittsburgh.



New Reefer-Car Cold Unit

End result of five years of research is this automatic, diesel-powered refrigeration system for rail cars, built by Carrier Corp. The compact unit operates on a 12½-kw. power supply and contains two compressors—each of which is capable of operating the system alone under normal load conditions. Refrigeration capacity will hold car temperatures at —10F. under the most severe commercial conditions.

FOAMGLAS®

the cellular, stay-dry insulation

Huge fermenting tank moves through open wall area of Stroh stockhouse. Note strong, moisture-proof FOAMGLAS in place in some wall areas . . . where it stood exposed to the weather for weeks. Engineers: Harley, Ellington & Day, Inc., Detroit.

On the strength of FOAMGLAS . . . Stroh Brewery got 30 days extra production

Rapid sales growth at The Stroh Brewery Company, Detroit, has required building two new stockhouses since 1953. Each went into production 30 days sooner because it was insulated with extra-strong FOAMGLAS. Here's why:

Stroh stockhouses consist of a number of double-floor and single-floor units . . . each surrounded by an envelope of FOAMGLAS. While other construction was being completed, a wall was left open. Fermenting and aging tanks and other equipment were moved through it.

FOAMGLAS was then installed, free-standing, in the building frame . . . and was left fully exposed to the weather for weeks. Stroh was able to finish interior construction and start operations some 30 days sooner because FOAMGLAS doubled as insulation *and* wall until the exterior masonry was finished. This was possible because FOAMGLAS is rigid and 3 times stronger than the next strongest insulation. Weather cannot harm it because its all-glass, sealed cell structure is waterproof.

FOAMGLAS gave Stroh other benefits, too. Its sealed glass cell structure makes FOAMGLAS its own natural vapor barrier. And, being inorganic, it can't shrink, swell or warp guaranteeing Stroh vapor-tight joints. Moreover, it *stays dry* for constant, long-lasting insulating efficiency . . . is vermin-proof and incombustible. These benefits can be *yours, too.* Prove it with six simple tests you can perform in your own office. Write today for a free sample and testing directions. Address . . .

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Workman is shown installing 6" multilayer FOAMGLAS wall insulation within Stroh stockhouse framing. 8" layer of insulation was applied on roof, 4" on basement floor and 3" on intermediate floors. Stroh also relies on moisture-proof FOAMGLAS for lasting insulating value in such other tough brewery uses as CO_2 storage areas, government cellar, low temperature piping, etc.

How Polyethylene-coated paper Keeps dry milk dry

Paper coated with a special compound based on BAKELITE Polyethylene by **Crown Zellerbach Corp.**, San Francisco, Calif., and fabricated into bags by **Richmond Paper Co.**, Highland, Calif., is used to package non-fat dry milk solids by **Challenge Cream and Butter Association**, Los Angeles, Calif.

This bag's inner coating of polyethylene works two ways to protect the contents. First, it keeps moisture and moisture vapor from getting through. Second, it forms a quick, tight heat-seal despite the powdery, dusty contents.

Many different types and weights of paper—as well as films and foils—are now being coated with BAKELITE Brand Polyethylene to obtain these advantages. In addition, highly inert BAKELITE Polyethylene resists the action of most chemicals, including oils, greases, and most acids. And it stays flexible at temperatures below freezing.

BAKELITE Resins serve the food industry in many ways . . . *vinyl* coatings on milk containers . . . *polyethylene* on ice cream, soup and other containers. *Vinyl*, *phenolic* and *epoxy* resins are specially compounded for coatings used on food processing equipment. For suggestions on how these materials may serve you, write Dept. WL-65.

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The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC.

Employs Guided Tractor

An electronic signal—emitted from a wire buried in the concrete floor—guides this operator-less tractor (Barrett-Cravens Co.) over a 300-ft. course at a food warehouse, operated by Fleming Co., Wichita, Kan. Unit has a top speed of 6 mph. and is also equipped with hand controls for conventional use.

Bulk Car Output Up

Food processors clamoring for scarce rail cars to handle bulk quantities of loose ingredients can take heart from a recent announcement from General American Transportation Corp., Chicago—manufacturer of the special Airslide carriers.

The company reveals that it is now delivering 657 cars—the fifth production run on these rail units. And nearly 1,200 cars are now booked for the sixth production run, scheduled to start Jan. 1, 1958.

Over 3,000 of the special units are now in service and on order. They are in increasing demand by food processors to cut materials handling costs for such ingredients as flour and sugar.

USDA Announces Peeler

Great accuracy in preparation of sweet potatoes is claimed for a new, rotary peeler developed by the Southern Utilization Research & Development Div. of USDA, New Orleans.

The machine, essentially a rotary drum with pockets in the periphery, uses a hot caustic solution. It makes possible close control of lye temperature and time of contact between potatoes and lye, and assures positive immersion and non-abrasive peeling.

Another example of STANDARD-HERSEY leadership!

**a specially designed self-aligning joint flange was developed which permitted the dryer to be installed in an "inaccessible" location.*

It's more than Standard Steel's routine of good design, quality materials and skilled workmanship that sells *Standard-Hersey* dryers...often it's the unusual engineering *ability to solve a difficult problem.* Time and time again new and old customers alike come to Standard Steel.

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YOURS ON REQUEST: Technical Bulletins describing the food applications of Kelco algin colloids.

At your service, too, are our highly qualified technicians, ready to give individual attention to solving your product and processing problems.

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Cable Address: Kelcoalgin, New York

Faster Growing Plants

Gibberellic acids—derived from a fungus that causes rice disease in the Orient—may soon speed growth of fruit and vegetable crops for procesing, as a result of research now underway at Abbott Laboratories, Chicago.

Now available in commercial quantities, the compound sparks earlier flowering, faster germination, and quicker release from dormancy for a wide variety of trees and plants.

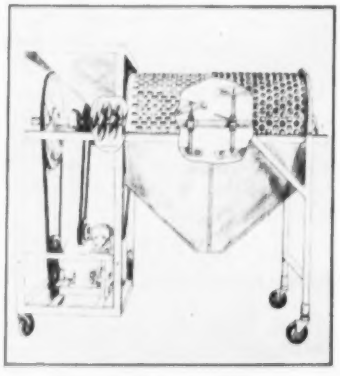
Though some research has been done on food plants, further investigation of residues is necessary before the acids can be recommended, declares a company spokesman.

Oat Extract for Teeth

A group of ten, phenol-type compounds and fatty acids—extracted from finely ground oat hulls—have been shown to give superior protection against cavities in teeth by two U. of Wisconsin researchers, F. Taketa and P. H. Phillips.

The scientists, working with rats, discovered that the preparation gives its dramatic results at a very reasonable cost. And they advance the suggestion that the compound be incorporated in candy and chewing gum —two products used widely by teenagers, who are most in need of preventive tooth care.

Continued research will be aimed at isolating the chemical or chemicals chiefly responsible for the effect, and at setting effective dose levels.



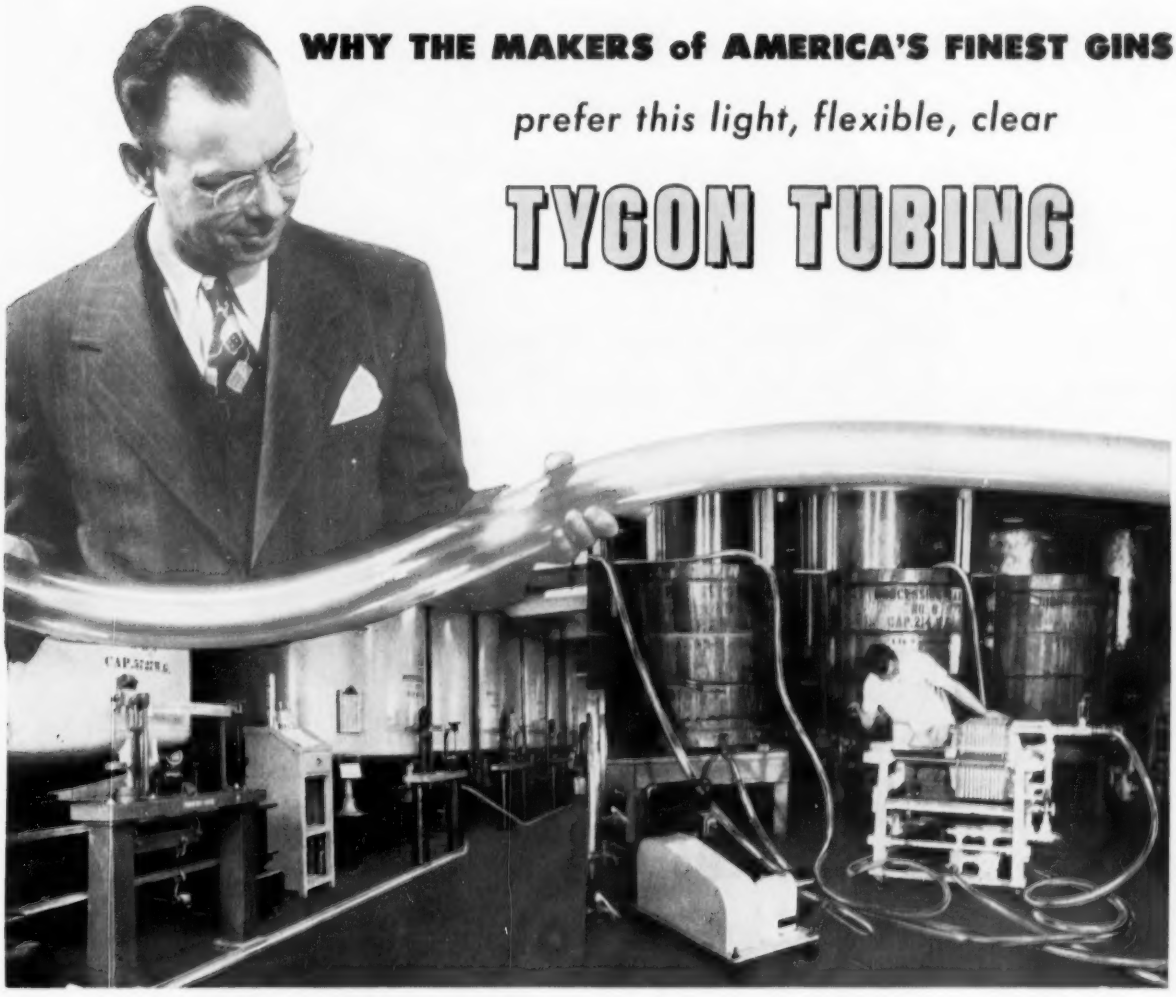
Pilot-Size Grape Stemmer

Development of a small stemmer—built to handle pilot- or research-sized batches of grapes—is announced by J. C. Moyer of the N. Y. State Agricultural Experiment Station, Geneva. The experimental unit can turn out 2,000 lb. per hr. at a beater speed of 500-600 rpm.

WHY THE MAKERS of AMERICA'S FINEST GINS

prefer this light, flexible, clear

TYGON TUBING



The problem of transporting water white gin from bottling tank to bottling machine was long a headache to its makers. The piping had to be flexible to permit the use of portable pumps. Rubber hose began to show signs of deterioration under the action of the alcohol within a few months. Particles of rubber would flake loose to show up only after the gin was bottled in clear glass. And rejections are costly.

Tygon plastic Tubing solved this problem as it solves many problems in safe transport of foods and beverages. Tygon is unaffected by food acids or by alcohols. It is glass clear, enables inspection to spot any foreign matter all along the line. Tygon's light weight appeals to the worker. It is easily handled. Easy to connect and disconnect. It is tough and sturdy, takes floor abrasion in its stride.

And, of course, of first importance to any manufacturer of food products, Tygon Tubing will not contaminate or affect the most delicate food products. It is completely non-toxic, completely safe to use. It can be sterilized. Its polished interior surface facilitates cleaning and its glass clearness automatically sets up high standards of cleanliness.

PRODUCT OF

U.S. STONEWARE

Plastics and Synthetics Division

74E-1

Tygon Tubing Formulation B 44-3 should be specified for food and beverage use. Bulletin T-97 describes Tygon Tubing formulations, gives full technical detail, physical and chemical characteristics. Write for it today. Plastics and Synthetics Division, The U. S. Stoneware Co., Akron 9, Ohio, Dept. FE 557.

Because Vulcan stocks the widest selection of Hi-Bake lined pails possible, manufacturers of chemicals, foods, drugs, oils, fertilizers, paints, varnishes and other hard-to-hold products have turned to Vulcan. They find Vulcan's years of experience coupled with constant field and laboratory research invaluable in solving their lining problems.

Do what so many others have done . . . bring your lining problems to Vulcan *first*. Let Vulcan's chemists lining-test your product. They will develop a Hi-Bake lining that will meet your most rigid specifications . . . one that will protect and maintain the quality and uniformity of your product. It will pay you in time and money saved.

Samples gladly supplied on request. Call or write today.

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See "Pails" in Classified
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Compression Cuts Hops Cost

Dramatic savings in storage and shipping costs for brewers' hops are said to be effected through use of a new double-compression packaging method, developed by Tri-State Processing Co., Yakima, Wash. Here, bulk of the normal shipping bale (right) is cut in half (left). The sealed polyethylene wrapper (Visking Co.) minimizes oxidation and conserves aroma. Technique is said to save over $1.00 per hundred pounds of hops in shipping.

Immersion Freezing Discussed By Poultry Fact Finders

Top interest has been focused on immersion freezing of poultry, because of the processing speed and improved meat color, W. J. Stadel, Purdue U., told the Poultry Industries' recent fact finding conference in Kansas City.

Studies show, he continued, that freezing temperature has little affect on color of birds previously chilled to 35F. But, a skin-tight package is of paramount importance for color uniformaity, he concluded.

The main economic advantage for this freezing technique, reported George Pinchin, Tend-R-Flesh, Inc., Petersburg, Ontario, is its efficient use of refrigeration capacity. While the propylene glycol requires more agitation than a brine system, initial cost of the first is less than for a brine set-up.

NARW Elects Officers

S. A. Kadane, Pure Ice & Cold Storage Co., Dallas, Tex., has been named new president of the National Assn. of Refrigerated Warehouses (NARW).

Other officers elected at the annual convention in Atlantic City, were P. G. Kuehn, Wisconsin Cold Storage Co., vice-president; and J. L. Bear, Kansas Cold Storage Inc.

FRICK

Refrigeration Serves Big Armour Laboratories

Armour and Co. use "cold" in many ways in their great Pharmaceutical Laboratories, recently opened near Kankakee, Ill. These uses include air conditioning, biological process work, cold storage, heat-pump service, and research.

Temperatures can be held anywhere between −45 and +45 degrees F., but usually go no lower than −10.

Here a 2-stage Frick system of 1422 tons refrigerating capacity operates with efficiency and economy. Installation by Midwest Engineering and Equipment Co., Frick Sales-Representatives in Chicago.

Four of eight ammonia compressors furnishing refrigeration at temperatures down to −45° F.

For that important refrigerating, air conditioning, ice making or quick freezing job of yours, look to dependable Frick equipment. Sales-engineering and service, the world over. Let us submit estimates now: write, wire or phone

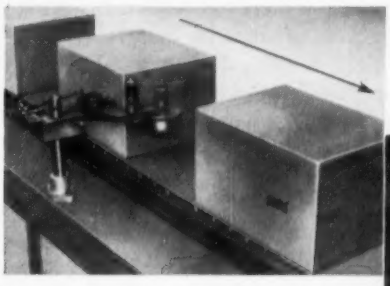
DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U.S.A.

Low-cost marking attachment pays for itself in weeks... saves thousands of $ every year

Imprints 1, 2 or 4 sides of cases in single pass



Friction-driven ROLACODER markers do your marking automatically... save cost of manual stencilling or stamping. Designed for easy do-it-yourself installation on existing conveyor lines, case-sealers, etc. They use quick-change rubber type or dies, hold 8-hour ink supply.

Write for Bulletin "ROL"

◀ ROLACODER twin-action markers ...for imprinting codes and lot numbers on 2 or 4 sides of cases simultaneously ...without requiring cases to be turned.

▲ ROLACODER single-side marker for accurate spot imprinting of brand names, varieties, code-dates, lot numbers on cases, cartons, fibre drums, bags, etc.

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Dept. G, Hillside 5, N. J.

In Canada: **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

Automatic **CODING, MARKING, IMPRINTING MACHINES**

THE MULTI-MILLION DOLLAR QUESTION . . .

Ask SARGENT

Whether this all-important question is settled in Sargent's Laboratory or in your own, Sargent Dryers for food processing are guaranteed to deliver the product dried accurately, carefully, to the exact degree of moisture content desired.

For rice, cocoa, coffee, cranberries, nuts, fruits, cereals, berries, vegetables and other food products — even bird seed! — and wherever natural flavor, color, form and quality are a must, Sargent Dryers and Sargent Coolers are best for the job.

They are unusually rugged and dependable. Designed for easiest cleaning, for economical maintenance and operation — there are no hidden or hard-to-reach areas in Sargent Dryers! Built in any length, width, capacity. Economical of space, stainless steel throughout as required, performance-proven and guaranteed, every Sargent Dryer and Cooler is designed for your particular product, your process, your production.

Want more information? Just call your nearest representative or write us direct.

C. G. SARGENT'S SONS CORPORATION

Graniteville, SINCE 1852 Massachusetts

Drying and Cooling Machinery for all Process Industries

PHILADELPHIA 19 — F. E. Wasson, 519 Murdock Road
CINCINNATI 15 — A. L. Merrifield, 730 Brooks Avenue
CHARLOTTE, N.C. — W. S. Anderson, Carolina Specialty Co.
ATLANTA, GA. — J. R. Angel, Mortgage Guarantee Building
TORONTO 1, CAN. — Hugh Williams & Co., 27 Wellington St. East

"Wigwam" Stores Bulk Sugar

Raw sugar, used in manufacture of refined sugar syrups, is now handled in a unique metal "wigwam" at Inland Sugar Co., Chicago. The 1,000-ton bulk barges are unloaded with a system of mechanical scoops and elevators that transfer the material directly to the conical tank shown above.

Announce Short Courses

Three short courses of interest to processors, scheduled for the month of June, have been announced by universities:

At Massachusetts Institute of Technology, Cambridge, Horizons in Food Technology, June 17-28. At State University of Iowa, Iowa City, a management course for foremen and executives, June 10-22. And at Purdue U., Lafayette, Ind., the Annual Microbiological Institute, June 3-8.

BRIEFLY

• **INSTANT COFFEE** is now being processed by the Kroger Co., in a brand-new $1,000,000 plant in Cincinnati.

• **STRAWBERRIES** for processing can now travel from fields to plant with greater protection in a new lug box devised by USDA's Agricultural Research Service. The container eliminates rehandling, cuts damages and costs.

• **EGGS** can now be vended in an automatic, refrigerated vending machine manufactured by Rowe Mfg. Co. The unit has a capacity of 100 doz., and dispenses at the drop of a coin.

• **CANNED FOODS** left in the Antarctic snows for over 40 years are now being put to use in FDA's study on radioactivity of foods. The foods will be used as controls to measure increases in radioactive content of foods canned since 1945.

• **COCOA BEAN** usage during the first quarter of '57 hit 123,503,574 lb.—a

New way to control Rancidification!

Antioxidant-impregnated cartons and wrappers protect flavor and aroma

Ionol, C.P. is an effective food-grade antioxidant. Impregnate boxboard and paper with it, and you protect aroma and flavor by preventing oxygen attack on fats right where it starts—at the surface of cartons and wrappers.

In actual tests, baked goods were stored at 85° F in Ionol, C.P.-impregnated boxboard cartons, which were found to be free of rancidity at the end of ninety days. Without Ionol, C.P. protection, packages of baked goods stored under similar conditions often develop rancidity within a week.

You can insure long shelf life and protection of your brand label's good name by asking for packaging materials containing Ionol, C.P. antioxidant. Write to Shell Chemical for names of suppliers of new Ionol, C.P.-impregnated packaging.

SHELL CHEMICAL CORPORATION

CHEMICAL SALES DIVISION, 380 Madison Avenue, New York 17, New York

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SHELL

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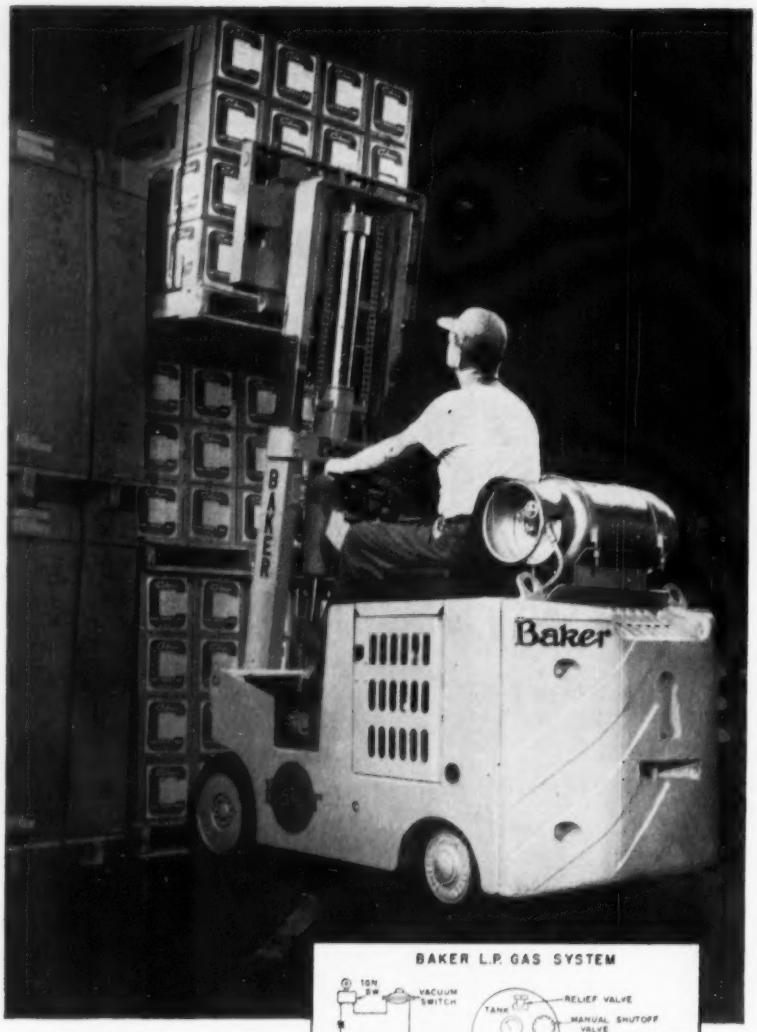
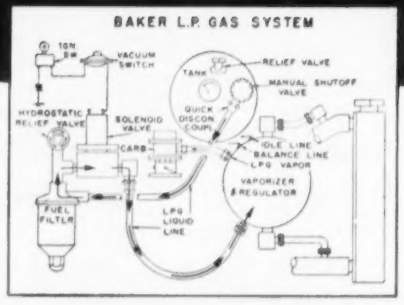
BAKER *offers LP gas fork trucks in 2000 to 7000 lb. capacities*



The complete Baker line includes the BAKER LP gas fork trucks for those desiring the cost savings, cleaner operation, and other advantages provided by liquefied petroleum gas.

The Baker LP gas truck is powered by an engine specially designed for LP gas, not just a conversion unit. The special LP engine is provided with high compression head for maximum efficiency. Among the features are a special cold manifold and hot thermostat for cooler operation. Stellite-faced exhaust valves and solid Stellite inserts assure greater dependability and longer life. Complete vaporization and more efficient combustion mean lower oil consumption, less down time and reduced maintenance costs due to minimum cylinder wear. Fuel tank conveniently located behind the driver can be removed and full tank installed in less than a minute.



Arrows trace the flow of LP gas from the tank through the filter to the vaporizer and regulator before it enters the engine. The hydrostatic relief valve opens the system before dangerous pressure is reached in event of high ambient temperature changes. Automatic fuel shut-off is provided by solenoid valve and vacuum switches when engine stops. For maximum efficiency, the vaporizer preheats the LP gas before it passes to the regulator and the regulator reduces the pressure before the gas enters the carburetor.

Write for information.

Baker industrial trucks

THE BAKER-RAULANG COMPANY

1277 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of Otis Elevator Company

Otis

604

6½% gain over first-quarter '56 figures.

• **FISH CANNERIES** are now being constructed in Korea by Standard Steel Corp., Los Angeles, under a contract with the United Nations Korean Reconstruction Agency.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the *Federal Register*.

Wheat, AMS revised U. S. Standards, *F.R.* Mar. 15, p. 1665.

Comb Honey, AMS deferment for establishment of U. S. Standards, *F.R.*, Mar. 16, p. 1725; correction, *F.R.*, Mar. 22, p. 1926.

Grapefruit juice, concentrated, AMS notice of U. S. Standards, *F.R.*, Mar. 20, p. 1797.

Grape beverage, frozen concentrate, AMS extension for filing data, *F.R.*, Mar. 27, p. 2014.

Sweet peppers, AMS proposed amendment of U. S. Standards, *F.R.*, Apr. 3, p. 2200.

Tomatoes, Italian type for canning, AMS notice of U. S. Standards, *F.R.*, Apr. 6, p. 2309.

Sauerkraut, canned, AMS notice of U. S. Standards, *F. R.*, Apr. 9, p. 2334.

On Copra, tolerances of ethylene oxide, *F. R.*, Mar. 12, p. 1591.

On apricots, tolerances of Maneb, *F.R.*, Mar. 8, p. 1842.

On potatoes, tolerances of sodium 2,2-dichloropropionate, *F.R.*, Mar. 21, p. 1888.

On apples, cherries, and pears, tolerances of 0,0-diethyl 0-(2-isopropyl-4-methyl-6-pyrimidinyl)-phosphorothioate, *F.R.*, Mar. 21, p. 1889.

On pineapples, tolerances of orthophenylphenol, *F.R.*, Mar. 21, p. 1889.

On spices and certain grains, tolerances of hydrogen cyanide, *F.R.*, Mar. 26, p. 1980.

On beet tops, chinese cabbage, collards, endive, kale, lettuce, mustard greens, romaine, spinach, and swiss chard, tolerances of Zineb, *F.R.*, Apr. 2, p. 2147.

On fat of meat from cattle, goats, hogs, and sheep, tolerances of Toxaphene, *F.R.*, Apr. 2, p. 2184.

On milk, popcorn, sweet corn, milo, sorghum, wheat, barley, oats, rice, rye, eggs from poultry, fat of meat from beef cattle, hogs, sheep, and poultry, tolerances of Endrine, *F.R.*, Apr. 2, p. 2185.

When a variable capacity is desired for strictly sanitary delivery of all types of dairy and other food products, specify the Viking "Sanitor" pump. The slow speed, positive displacement Viking "Sanitor" pump eliminates the excessive churning, aerating and recirculating of high speed pumping. Four sizes with capacity range of 4 to 90 gallons per minute are available.

Ask for Catalog FE today.

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, it's "*ROTO-KING*" pumps

See our Catalog in Sweet's Plant Engineers File

Just out . . . actual case histories of production line savings

We've compiled 35 different case histories from our files proving that many manufacturers can effect really worthwhile savings with USS Cyclone Processing Belts. The whole story is in a new booklet that's yours for the asking. You'll see how producers have cut costs, increased production, saved space and time and lowered labor costs . . . all with Cyclone Belts. These examples explain the use of Cyclone Processing Belts in stainless and carbon steels, in various shapes, designs and sizes . . . all of them saving money for their users. Just fill in the handy coupon. We're sure it will be well worth your while.

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AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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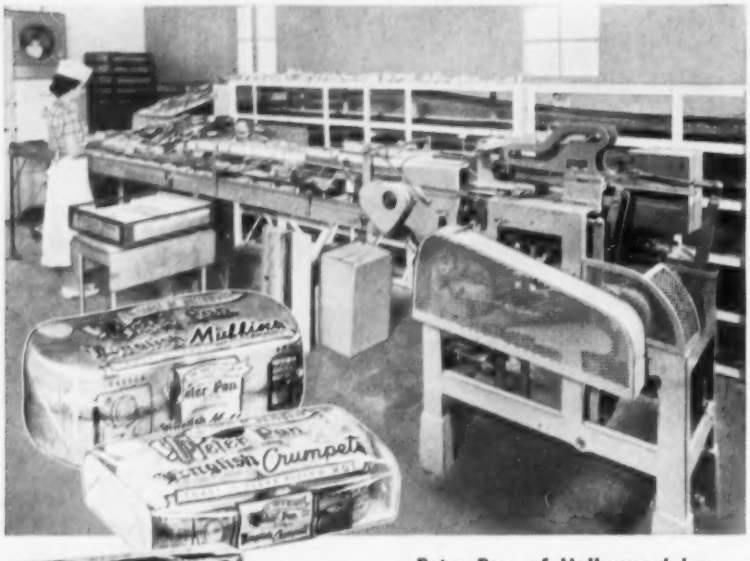
"World's most versatile WRAPPING MACHINE"



Peter Pan of Hollywood has greatly stepped up sales and economy with this new Hayssen automatic wrapping machine.

● Add "sparkle" to your specialty packaging on the new Hayssen automatic wrapping machine.

Hayssen is the *only* wrapper to offer so much versatility, sales appeal, product protection, economy and efficiency at such a low initial cost and maintenance record. The Hayssen offers perfect register of printed wrapper design and the new Top labeler attachment lends greater flexibility to your packaging by automatically affixing a thermoplastic label on top of your package, in any position desired.

Let our experienced packaging engineers help you with your packaging problems. Write TODAY!

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first in Automatic Packaging Since 1910

Albany • Atlanta • Chicago • Dallas • Denver • Detroit • Houston • Jackson, Miss.
Los Angeles • Minneapolis • New York • Philadelphia • St. Louis • San Francisco • Montreal • Toronto

On plums, tolerances of ethylene dibromide, *F.R.*, Apr. 5, p. 2275.

On apples, apricots, crabapples, nectarines, peaches, pears, and quinces, tolerances of 0,0-dimethyl S-4-0x0-1, 2, 3-benzotriazinyl-3-methyl) phosphorodithioate, *F.R.*, Apr. 12, p. 2511.

On melons, tolerances of sodium dimethyldithiocarbamate, *F.R.*, Apr. 13, p. 2535.

American cheese food, grated, FDA Standard of Identity, notice of time extension for filing data, *F.R.*, Mar. 13, p. 1613.

On grapefruit, lemons, and oranges, exemption from tolerances of diphenyl, *F.R.*, Mar. 15, p. 1681.

Niacin and riboflavin, extension of filing time on proposal to amend regulations concerning label statements, *F.R.*, Mar. 21, p. 1889.

Schedule of Events

May

12-16—Institute of Food Technologists, annual meeting; Penn-Sheraton Hotel, Pittsburgh.

14-16—Armour Research Foundation, industrial nuclear technology conference; Museum of Science & Industry, Chicago.

17-18—National Fruit & Syrup Mfrs. Assn., annual meeting; Hotel Roosevelt, New York City.

19-22—Flavoring Extract Mfrs. Assn., annual convention; Roosevelt Hotel, New York City.

19-23—American Assn. of Cereal Chemists, annual meeting; Sheraton-Palace Hotel, San Francisco.

20-23—Design Engineering Show; Coliseum, New York City.

22-24—American Society for Quality Control, annual convention; Masonic Temple, Detroit.

June

3- 5—American Society of Refrigerating Engineers, annual meeting; Hotel Fontainbleau, Miami Beach, Fla.

9-12—International Fancy Food and Confection Show; Palmer House, Chicago.

10-13—National Confectioners' Assn., annual convention & exposition; Conrad Hilton Hotel, Chicago.

11-13—Western Plant Maintenance & Engineering Show; Civic Auditorium, San Francisco.

13-15—Rice Millers' Assn., annual meeting; St. Louis, Mo.

13-15—Instrument Society of America, symposium on instrumental methods of analysis; U. of Chicago.

16-29—Material Handling Training Conference; Industrial Management Center, Lake Placid, N. Y.

26-29—Processed Apples Institute, annual meeting; Greenbrier Hotel, White Sulpher Springs, W. Va.

26-29—American Dairy Science Assn., annual meeting; Oklahoma A & M College, Stillwater.

27-J2—Bakery Equipment Mfrs. Assn., annual meeting; Manior Richelieu, Murray Bay, P. Q., Canada.

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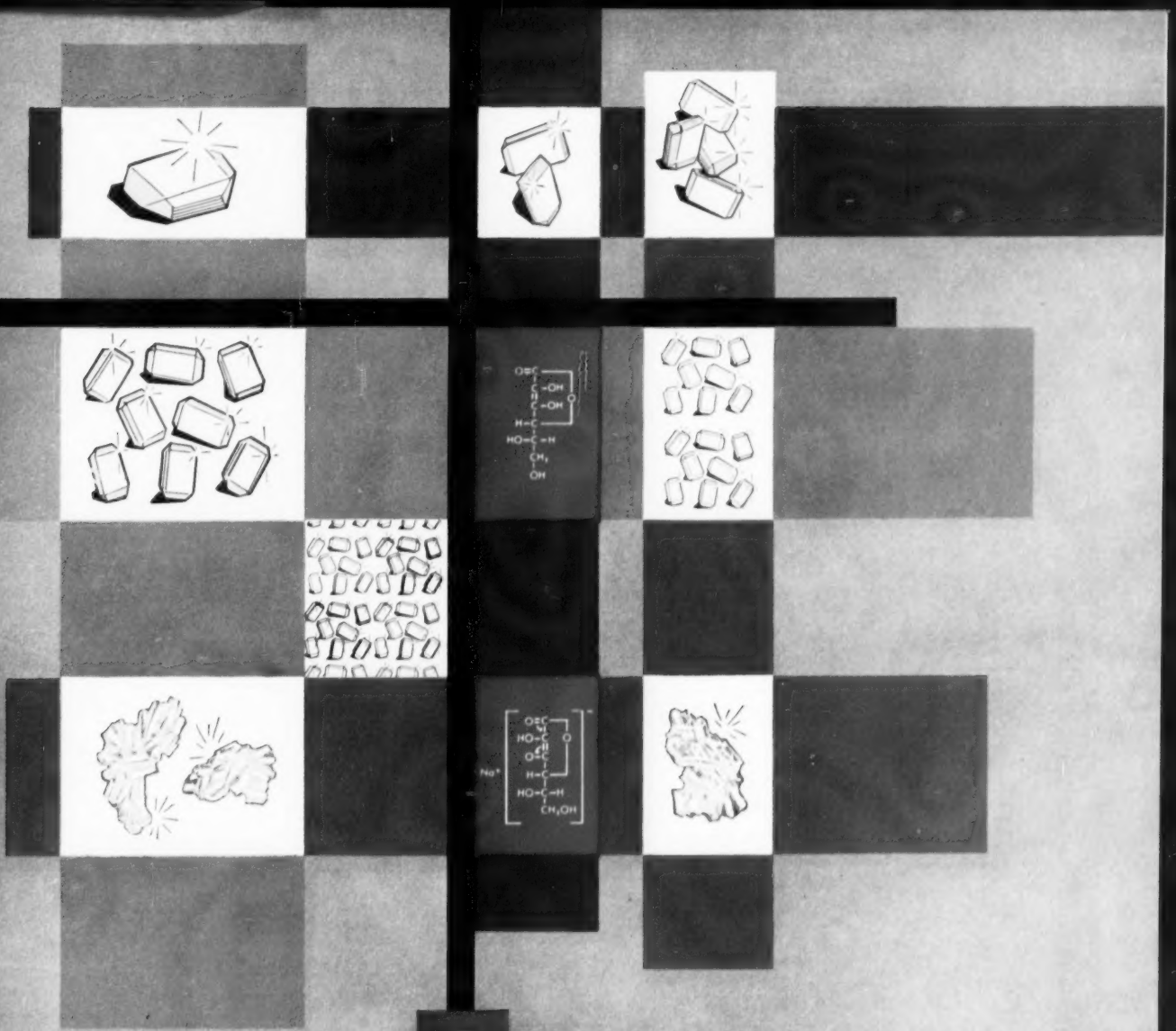

VITAMIN C COMES RIGHT FROM ROCHE

You get vitamin C "by the tons" from Roche.

l-Ascorbic acid so produced by Roche care and skill is identical chemically and biologically with nature's product. It is pure and beneficial.

For remedying widespread nutritional deficiencies, vitamin C 'Roche' needs little proof of performance in supplementing diets. Its excellence is accepted—its efficacy established.

Food freezers and packers, seeking ways to make their good foods better, will gain by using 'Roche' ascorbic acid. Pharmaceutical manufacturers, too, can put their full reliance on Roche for pure vitamin C, made to U.S.P. standards, delivered promptly in protective packaging.

Roche, the headquarters of vitamin C knowledge since 1937, has a wealth of information and expert technical help. Make it work for you.

ORDER right . . . ORDER from Roche

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VITAMIN C

Laboratory Data Sheet

ROCHE

/-ASCORBIC ACID, U.S.P.
COATED /-ASCORBIC ACID—97.5%
SODIUM /-ASCORBATE

- The first to achieve commercial production of vitamin C by the famous Reichstein synthesis.
- Roche produces every useful type of /-ascorbic acid to meet virtually every manufacturing need.
- Single uniform lots as high as 3000 kilos, saving you assay costs.
- All types are uniform, readily soluble and easy to handle.
- Roche guarantees highest quality, held to rigid specifications.
- Quick delivery from strategically located warehouses.
- Packaged to protect original quality in sealed tamperpruf containers.

/-ASCORBIC ACID, U.S.P. 'Roche'

TYPES	DESCRIPTION AND USES
GRANULAR TYPE 20-60	100% (-) passes through 20 mesh, 95% is retained on 60 mesh. Similar to granulated sugar in particle size. Satisfactory for direct addition to dried granulations.
FINE GRANULAR TYPE 40-80	100% (-) passes through 40 mesh, 95% is retained on 80 mesh. A free-flowing product similar to table salt in particle size. Recommended for tablet granulations where fine powder is considered less suitable because of denser packing.
SUPERFINE GRANULAR TYPE 60-100	100% (-) passes through 60 mesh. Approximately 25% remains on 100 mesh. 45-50% passes through 100 mesh and remains on 200 mesh. 25-35% passes through 200 mesh. A very fine free-flowing crystal suitable for dry gelatin capsules or tableting. Useful in dry mixtures, food supplements.
FINE POWDER TYPE 100	100% (-) passes through 100 mesh. Produced by grinding crystalline material. Non-abrasive on tableting dies. Widely used for granulations, solutions, food supplements. Minimizes fractionation of particles in dry mixtures.
ULTRA FINE (MICRO) POWDER TYPE 325	Minimum 99% through 100 mesh. Minimum 90% through 200 mesh. Milled extremely fine. Practically devoid of abrasive action on cutting dies. Screen tests above 200 mesh are unreliable because of static forces. Up to 8% may be retained. Similarity to "micro" ranges, etc. Sedimentation tests and measurement of particles are the only means that can be used to determine if more than 10 percent will pass 325 mesh.
AMPUL TYPE	Very fine crystals easily dissolved. Minimum color. Specially produced and tested for use in parenteral solutions. See Roche technical brochure "Notes on Vitamin B, and Vitamin C Parenteral Solutions" for complete details.
TYPE F	Especially produced for use in the food industry. Free-flowing, will not dust or clump, dissolves easily. U.S.P. in quality. 100% through 50 mesh, 98-99% remains on 200 mesh.

DATA ON PARTICLE FINENESS

Based on: U. S. P. XV, pages 931-3; N.F. 10, pages 702-3; "Lange's Handbook of Chemistry" 9th Edition, page 911

The fineness of "powders" is described in both the U.S. Pharmacopeia and National Formulary in terms which are related to the number assigned to a standard sieve made of woven wire cloth. The size of wire, and sieve opening are standardized together with permissible variation in both average and maximum openings.

Sieve Number	Sieve Opening in Microns	Sieve Opening Mm	Permissible Variation in Average Opening Per Cent	Permissible Variation in Maximum Opening Per Cent	Wire Diameter Mm
50	297	0.297	± 5	± 25	0.170-0.253
100	149	0.149	± 6	± 40	0.096-0.125
200	74	0.074	± 7	± 60	0.045-0.061
#325	44	0.044	± 5	± 60	0.036

Standards are established for defining the fineness of powdered chemicals, together with a technique for determining the uniformity of fineness. The types of powders described in the U.S. Pharmacopeia and National Formulary do not represent the full range of particle sizes commercially available. No procedure is given for the determination of particle size in the "ultra-fine" or "micro powder" range, sometimes referred to as No. 325. This requires a sedimentation method and measurement in microns. Ordinary sieving methods are inaccurate.

The variation possible in the standard sieves plus such variables as the motion applied to the screen and physical characteristics of the powder being screened affect accuracy and duplicability of screening tests. Particle size specifications based on mesh sizes must always be regarded as nominal rather than as strictly accurate limits of particle size and distribution.

COATED /-ASCORBIC ACID—97.5% 'Roche'

DESCRIPTION

Coated ascorbic acid 97.5% 'Roche' is a fine, white, or nearly white powder. It is pure U.S.P. ascorbic acid powder coated with ethyl cellulose. The manufacture of coated ascorbic acid is licensed under Patent No. 2,410,417 to Roche and customers of Roche.

SPECIFICATIONS

Particle Size	100% through .16 mesh screen 75-92% through .40 mesh screen 45-80% through .60 mesh screen 35-60% through 100 mesh screen
Assay	Minimum 97.5% /-ascorbic acid
Identity test	Positive for /-ascorbic acid
Loss on drying	Negligible

USES AND DATA

Ethyl cellulose coated ascorbic acid 'Roche' has these advantages in pharmaceutical tablet manufacture:

- Small size, high potency (250-500 milligrams) tablets of light color can be made from dry granulations with very little excipient.
- Aids in eliminating chipping and capping during compression.
- Retards discoloration, mottling during abnormal storage conditions.
- Reduces contact of ascorbic acid with reactive materials.
- Rapidly available in aqueous solution for assay.
- Provides a tablet with slower release of ascorbic acid, tending to reduce localized acidity sometimes experienced with high potency tablets.

FOOD MANUFACTURERS

- Manufacturers of cured meats can use this type to advantage for retarding smokehouse activity, and for better protection in spice mixtures. It may also provide longer protection of color and flavor during storage and display.

SODIUM /-ASCORBATE** 'Roche'

This is the sodium salt of /-ascorbic acid. It is available as an odorless, tasteless, anhydrous, fine white powder or fine granular substance.

The antiscorbutic activity is in molecular proportion to /-ascorbic acid, one milligram of the sodium salt being equivalent to 0.889 milligram of the acid, or one milligram of the acid equivalent to 1.124 milligrams of sodium /-ascorbate.

Highly soluble in water—62 grams/100 ml at 25°C; 78 grams/100 ml at 25°C. Aqueous solutions are unstable, easily oxidized on exposure to air, or other factors which affect /-ascorbic acid.

The pH of a sodium /-ascorbate solution is from 5.6 to 7.+ as compared with a pure /-ascorbic acid solution at pH 2.3-2.5. The more neutral characteristic of the sodium salt recommends it for high dosage oral forms where gastric sensitivity to lower pH might be undesirable. It is useful in combination with ingredients which would react unfavorably under more acid conditions. Products can be buffered to a suitable pH by combining sodium /-ascorbate and ascorbic acid together.

Commercial forms of sodium /-ascorbate are not recommended for preparation of parenteral solutions. It is more satisfactory to prepare suitably buffered solutions of 'Roche' ampul type /-ascorbic acid, using sodium bicarbonate according to the special Roche method described in our technical brochure, "Notes on Vitamin B, and Vitamin C Parenteral Solutions."

Sodium /-ascorbate is of value as an antioxidant for use in comminuted meats and in curing pickles for hams, bacon, and corned beef. Because it is the salt of /-ascorbic acid (vitamin C), a substance naturally occurring in meats and identified in the U.S. Pharmacopeia, it may be preferred to antioxidants in the "chemical additive" class.

THESE PRODUCTS ARE FOR ANTIOXIDANT USE ONLY. IF USED IN FOOD PRODUCTS, NO CLAIM FOR NUTRITIONAL VALUE CAN BE MADE.

****Sodium d-isoascorbate, 'Roche'**, antioxidant with virtually no vitamin C activity. A white, free-flowing crystalline material. Slightly less soluble than /-ascorbic compounds. When replacing /-ascorbic acid, 23% more should be used to obtain equal antioxidant activity and 8% more when replacing sodium /-ascorbate. These differences are due to the presence of both sodium and water of crystallization which are inactive. Literature on request.

d-Isoascorbic acid 'Roche'—antioxidant. Similar to sodium d-isoascorbate described above. Useful where acid reaction or absence of sodium is desirable. 10% less than sodium d-isoascorbate or 10% more than /-ascorbic acid (because of water crystallization) is required for equivalent antioxidant activity.

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, NEW JERSEY

Pacific Coast distributor: L. D. Kohler Company, San Francisco, Los Angeles, Seattle, Portland, Salt Lake City • In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West, Montreal, Quebec

(Reprints available)

MEN & COMPANIES

Personnel

Robert B. Ball is newly elected v.-p. in charge of manufacturing and engineering, and board member for Diamond Crystal Salt Co., St. Clair, Mich.

Brown W. Cannon has been named to the position of western regional v.-p. by Beatrice Foods Co., Chicago.

Dr. James B. Evans and **Dr. J. Walter Giffee**, respectively, have been appointed chief of division of bacteriology and chief of division of hide research for American Meat Institute Foundation, Chicago.

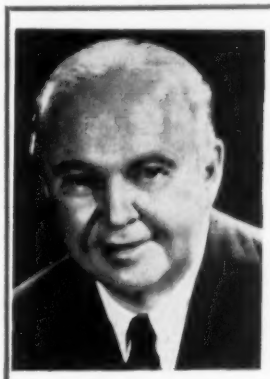
Harold M. Freund, Andreas F. Reising, Ray J. Thelen, H. Alvin Meyer, and **Clifton R. Scarborough** have been elected president, first v.-p., second v.-p., third v.-p., and chairman, respectively, of the American Society of Bakery Engineers.

Kenneth L. Frank has been elected v.-p. and board member of Red Star Yeast Co., Milwaukee.

Carl H. Haurand is newly elected v.-p. in charge of manufacturing for Best Foods, Inc., New York City. He succeeds Harold B. Viedt, who recently retired.

Dr. John A. King has recently been appointed director of research for Armour & Co., Chicago.

John E. Nagel is recently elected president of Coca-Cola Bottling Co. of Rhode Island. James A. Farley, chairman of board of company's export organization, was former Rhode Island president and



Ralph Leroy Nafziger
—50 years of achievement in baking

Recently elected chairman of the board of Interstate Bakeries Corp., Ralph Leroy Nafziger has long been a leading figure in his field. He served as president of Interstate for 27 years, and continues as chief executive officer in his new position. He will devote his attention to new products, baking techniques, and further development of his organization.

Rounding out his 50th year in baking, Mr. Nafziger is serving his second term as chairman of the governing board of American Bakers Assn. In that position, he is a recognized leader of the entire baking industry.

Often bad tidings are omens of great things to come. In 1905 Mr. Nafziger, then a promising architectural student, received notice that his father's bakery in Kansas City, Mo., had gone bankrupt. In order to salvage the family concern, he put aside his thoughts of personal accomplishment in the architectural field, left school, and took over the crippled concern. Within a few years he had the company back on its feet, had paid off his father's debts, and began expanding.

In 1930, Interstate Bakeries Corp. was formed, with Mr. Nafziger as president. Since then, the firm has grown to a $100 million a year business —with 22 bread and 6 cake bakeries and 114 sales branches. It employs 6,521 people.

With Mr. Nafziger's election to board chairman, John R. Dow was advanced from executive vice-president to president of Interstate.

New "Built-in" Process Refractometer Assures Continuous... Accurate... Easy Quality Control

The internationally known GOLDBERG PROCESS REFRACTOMETER is designed for the continuous precise, rapid and easy determination of total soluble solids . . . in turbid and dark-colored concentrates, jellies, jams, pastes, purees, juices, syrups, preserves, milk products . . . and in other solutions.

Three models are available in Brix ranges: 0 to 25%, 12 to 72% and 36 to 82%. Any model can be mounted on the side wall of a process vessel, evaporator, vacuum pan, fruit-spread cooker, product pipe line or other location where continuous reading is desirable. The refractometer may also be mounted into a fixture that runs onto a track above a row of kettles for sample ladling.

The unique optical system transmits a sharp transition line from light to dark onto the large .5% graduated scale in the focusable eyepiece.

The illuminating unit consists of a 6 volt, ¼ ampere, long-life bulb . . . detachable socket and cord.

The compact and rugged refractometer when mounted into the process vessel is vacuum and pressure-tight . . . designed to withstand pressure of 20 pounds and temperatures ranging up to 110°C (230°F). The instrument is readily removable from coupling flange.

Instruments are factory calibrated. Recalibration to operating temperature is accomplished by a simple exterior set screw adjustment. A manually-operated wiper always brings fresh product sample to the prism face.

The GOLDBERG PROCESS REFRACTOMETER offers the following important advantages: accurate readings are instantaneous . . . withdrawal of sample not necessary . . . evaporation errors eliminated . . . readings unaffected by viscosity, foam, air bubbles and pulp . . . no operator training period is required.

Why not write for further details today!

American Optical Company
Instrument Division, Buffalo 15, New York
Dept. Q277

Gentlemen:

Send complete information on:

- ☐ Goldberg Process Refractometer
- ☐ Goldberg Combination Hand and Dipping Refractometer

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Address _____

City _____ Zone _____ State _____

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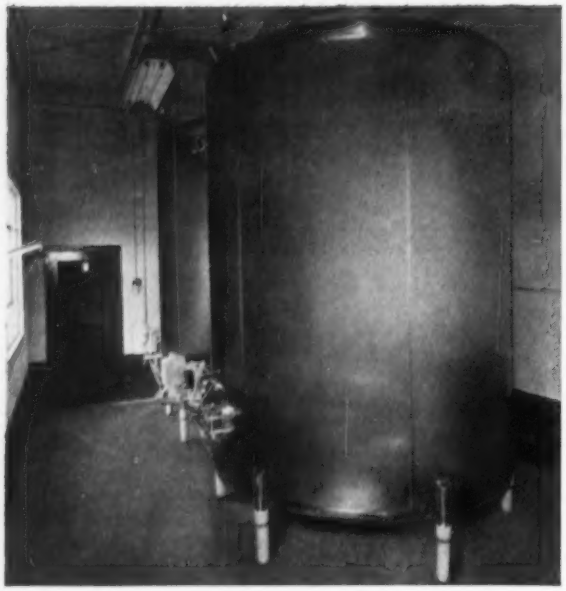


Model "C" closed-top tanks. Vertical sizes, 750-3500 gallons. Horizontal sizes, 500 to 5000 gallons.

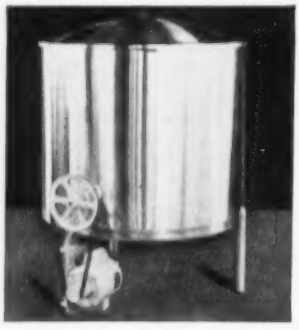
Is this stainless steel tank big enough . . . or too big?

When you order tanks from Cherry-Burrell there's no such thing as a size limitation. Our *standard* stainless steel tanks range from 60 gallons through 5000 gallons capacities—larger and smaller tanks available on special order.

Just tell us what size you need, whether you want a single shell tank or one for heating and cooling, closed top or open top types. Your Cherry-Burrell Representative can tell you how we do it. Why not give him a call or write for literature?

Typical Cherry-Burrell Tank Uses

Water Storage
Ingredient Storage
Syrup Making
Liquid Sugar Making
Liquid Sugar Storage
Corn Syrup Storage
Bulk Storage of Bottling Syrup



Model "O" open-top tanks; capacities 60 to 500 gallons.

CHERRY-BURRELL CORPORATION
427 W. Randolph Street, Chicago 6, Ill.
Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies
SALES AND SERVICE IN 58 CITIES—U.S. AND CANADA

now continues as a director of the company.

Edwin A. Olson has been named general traffic and warehousing manager of Libby, McNeill & Libby, Chicago.

Charles W. Pike is newly appointed manager of Kroger Co.'s Cincinnati, Ohio, plant.

Rufus E. Ryan has been transferred to Colorado Springs, Col., to assume duties of manager of industrial sales service department of Holly Sugar Corp., Eastern Sales Div.

V. Stoianoff, former president of Holsum Bread Co., Battle Creek, Mich., has resumed that position in company.

Floyd Segel, v.-p. Wisconsin Packing Co., Milwaukee, has been elected to board of American Meat Institute, Chicago.

Richard G. Sanders is new director of marketing and planning for Borden Co.'s special products division.

R. M. Sommer is assuming the duties of chief plant engineer at Pabst-Eastside brewery in Los Angeles.

Industry

Cedergreen Co., Bellingham, Wash., reports purchase of Minute Maid Corp.'s processing plant at Lynden, Wash.

C. A. Durr Meat Packing Co., Inc., Utica, N. Y., is celebrating its 50th year of operation.

Alexander N. McFarlane has been elected president of Corn Products Sales Co. He was formerly v.-p. and general sales manager of Corn Products Refining Co.

M. J. Martin is the newly elected executive v.-p. of Penick & Ford, Ltd., Inc., New York City. He will continue to be responsible for sales activities of company's packaged grocery department.

Clinton Corn Processing Co., Clinton, Iowa, officially observed its 50th anniversary on Apr. 22.

Fradelis Frozen Food Corp., Los Angeles, has made a 12,500 sq. ft. addition to its plant.

G. S. Suppiger Co., Collinsville, Ill., announces a change in its company name. It will henceforth be known as Brooks Foods, Inc.

Inland Empire Dairy Assn. announces it will start construction of a $3 million Darigold milk products plant in Spokane, Wash. Operation is planned for summer of '58.

Nebraska Consolidated Mills Co., Omaha, announces acquisition of Garland Mills, Inc., Greenburg, Ind., also flour mill and elevator of Lillie Mills Co., Franklin, Tenn.

Pepsi-Cola Bottling Co. reports opening of a new plant in Tulas, Okla.

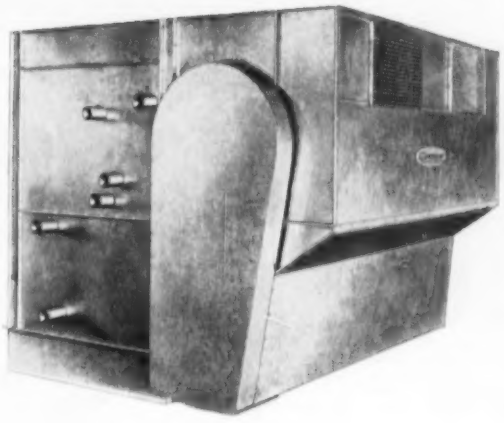
Refined Syrups & Sugars, Inc., Yonkers, N. Y., announces that it has merged with Corn Products Refining Co. The company organization will continue to operate in its present form.

Rockwood & Co., New York City, announces sale of Rockwood Chocolate Div. to Sweets Co. of America.

Seabrook Farms reports purchase of Luchow Products

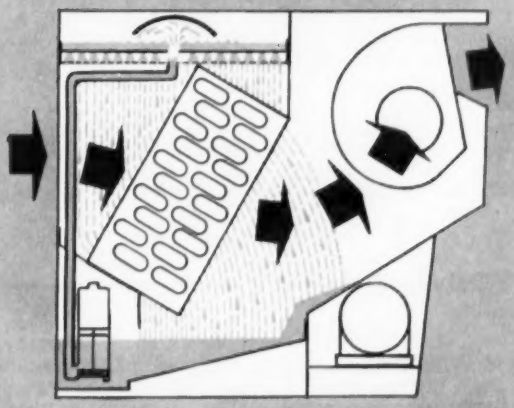
a completely new evaporative condenser design—by Carrier!

Exclusive new water distribution method requires no spray nozzles or eliminators. New light-weight, low-silhouette units ideal for roof-top installations. Easy access for servicing parts.



From Carrier, originator of the evaporative condenser, comes another major advance—an evaporative condenser completely new in design. This new unit sets new standards of efficiency in heat disposal where water supply and drainage are problems. Capacities range from 5 to 250 tons for all refrigerants. The principles and advantages of the new design are explained briefly below. For complete information, look up the Carrier dealer or branch office listed in the Classified Directory. Or write Carrier Corporation, Syracuse, New York.

AIR CONDITIONING · REFRIGERATION · INDUSTRIAL HEATING Carrier



New design features of Carrier Evaporative Condensers

Using a unique, Carrier-developed water distributing process, the new Evaporative Condensers operate without spray nozzles or eliminators. Here's how: Powerful centrifugal fans draw liberal quantities of air into the unit and over the water-drenched condensing coil. The evaporative cooling effect of the air on the water passing over the coil condenses the refrigerant vapor in the coil tubes. The liquefied refrigerant then passes from the coil and returns to the cooling system, where it is used in evaporators for air conditioning or process refrigeration.

Coil wetting is accomplished by a simple but highly effective water distributing pan arrangement above the condensing coil. Water, pumped to the top of the pan, is diffused evenly over the entire coil surface through regularly spaced orifice openings in the pan. As the metered water passes through the lower interceptor screen, it is broken into small, rainlike droplets which completely drench the coil surface. Completing the cycle, the water flows by gravity into the base pan, where it is strained before being pumped again to the water distributing pan above.

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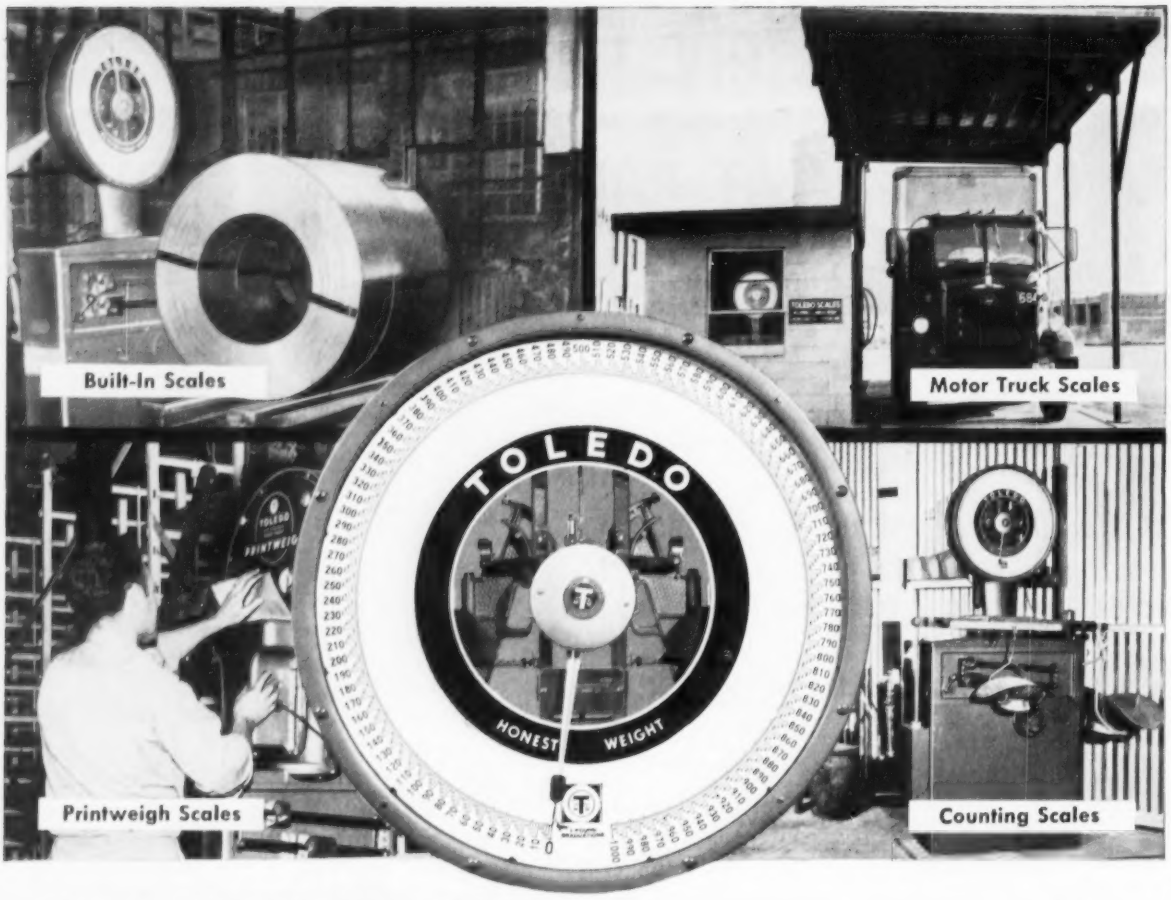

THIS FAMILIAR FACE . . . helps solve plant-wide cost control problems *Everywhere!*

This "face" identifies dependable, versatile Toledo scales. You'll see it plant-wide wherever managements see weighing in its true perspective—*as a vital element in the overall cost control system.*

This means the right scales in the right places . . . to supply basic accounting records of materials received, processed, shipped or transferred. Weight records directly affect costs, inventory, quality and customer relations. They are *fundamental* to sound cost control. Today's pressure on profits calls for integration of weighing in a *plant-wide weighing system.*

To learn the job *your* scales are now doing, we invite you to send for the new Toledo Weight Fact Kit. It will help you determine how well your scales measure up as a weighing system—help you detect weighing inefficiencies that drain profits. **REQUEST YOUR WEIGHT FACT KIT NOW.** No obligation. Address Toledo Scale Company, 1404 Telegraph Road, Toledo 1, Ohio.

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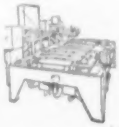
CUSTOM PRODUCTS FOR INDUSTRY

REMOTE DIGITAL WEIGHTS. Toledos automatically transmit weights to electric office machines located anywhere.

ELECTRONIC SCALES give electronic wings to weights; head may be located anywhere.



TESTING Toledos today test a wide range of parts; this device for leaf springs.

AUTOMATIC BATCHING SYSTEMS interlock batteries of scales.

Dr. Arthur N. Prater is newly elected v.-p. of Consolidated Foods Corp., Chicago. Meanwhile he will continue as president of company's Gentry Div., Los Angeles.

Corp.'s pre-cooked frozen food business. The transaction gives Seabrook exclusive right to use Luchow's name in frozen food field.

Thos. D. Richardson Co., Philadelphia, has merged with Beatrice Foods Co., it has been jointly announced.

Associated Industries

Ungerer & Co., Inc., New York City, reports appointment of Roy Hagelin as sales manager.

Borg-Warner Corp., Chicago, announces appointment of Andrew B. Pulliam as v.-p. and general manager of its Marvel-Schebler Products Div., Decatur, Ill.

Babcock & Wilcox, New York City, has elected M. Nielsen president. He succeeds Alfred Iddles, who is retiring.

Stein, Hall & Co., New York City, announces appointment of Robert Becker as manager of industrial foods department, and Nicholas Di Masi as manager of St. Louis branch office.

Bradley Container Corp. reports election of Leonard A. Britzke as president.

Can Manufacturers Institute has elected William J. Milton president.

H. Kohnstamm & Co., Inc., New York City, announces election of Lewis J. Woolf as chairman of board, and Paul Kohnstamm as president.

Warner Electric Brake & Clutch Co., Beloit, Wis., announces appointment of Norman Anderson as v.-p. and general manager of industrial div., and King DeSeve as v.-p. and general manager of automotive div.

Deaths

Carlton W. Crumb, director of technical data for Dorr-Oliver, Inc., Stamford Conn.

Wilbur Laroe Jr., general counsel of National Independent Meat Packers Assn., and Eastern Meat Packers Assn.

James Albert McDonald, 86, head of McDonald Jam Factory, Nelson, B. C.

Thomas L. Smith, 79, former president and board chairman of Standard Brands, Inc., New York City.

Wetmore Hodges, 69, organizer of General Foods Co. and General Seafoods Corp., Gloucester, Mass., which later became General Foods Corp., and associate with Clarence Birdseye in development of frozen food process.

Glen Sorber, 61, retired liaison officer for USDA's Western Utilization Research Branch, Albany, Calif., and long time researcher, notably in the frozen field. (see special item, FE Feb., p. 151)

Dr. Anderson R. Cover

Ralph Cover (right), head of The United Co., Westminster, Md., has the record of attending 46 National Canners conventions. And **Dr. J. A. Anderson** (left), director, Grain Research Laboratory, Winnipeg, is to receive the Thomas Burr Osborne Medal at this month's AACC meeting. Through error, April FE ran Mr. Cover's picture over copy referring to Dr. Anderson —hence our photo-clarification above.

PICK Clinton®

CORN STARCH . . .
. . . CORN SYRUP
. . . REFINED CORN OIL
. . . DEXTROSE

Among food processors using Clinton products, you'll find them all — canner, packer and baker . . . brewer, candy and ice cream maker.

All these food processors have one thing in common: They know that *quality* processing requires *quality* ingredients. For many years, Clinton has had a reputation for producing the very best in dextrose (Clintose), corn starches, corn syrups and refined corn oil for the food industry.

That's why our customer files hold some of the best-known food names in America. If *your* name's not there, it ought to be! Can we get together soon?

and remember : technical service in connection with your specific problems is available upon request.

Quality products
FROM THE WORLD'S CORN CENTER
CLINTON
CLINTON CORN PROCESSING COMPANY
CLINTON, IOWA
Our 50th Anniversary Year 1907 - 1957

Save horsepower!

Equip screw conveyors with LINK-BELT components

Today . . . LINK-BELT alone offers a complete line of ball and roller bearing accessories . . . plus everything else needed for the modern screw conveyor

THIS complete package of power-saving components can make a big difference in the rotating efficiency of your screw conveyors. And all are made by Link-Belt — *one source* for complete screw conveyor systems.

Countershaft ends, as well as new trough ends and hangers, incorporate Link-Belt self-aligning ball or roller bearings. Their free-rolling action reduces starting and running friction — lowers power requirements.

Power units feature the Link-Belt enclosed Motogear that provides better than 96% efficiency. And Link-Belt offers the new Quik-Link conveyor screw for ease in removal of screw or accessories.

Call a nearby Link-Belt office or authorized stock-carrying distributor for facts. Write for Folder 2489.

On new or existing screw conveyors . . . these LINK-BELT components

DOUBLE BALL BEARING TROUGH END provides drive shaft rigidity by supporting shaft at two points. It resists overhung loads at drive end and takes thrust loads of screw in either direction.

SPACER BLOCK keeps dirt out of bearing —stops grease, etc., from contaminating product. Can be used with lip, felt or waste packing seal to prevent bearing-product contact.

BALL BEARING HANGER. Self-aligning bearing and seal adjust to shaft deflection . . . prevent lubrication problems, noises, loss of efficiency, bearing, shaft or hanger damage.

Save maintenance!

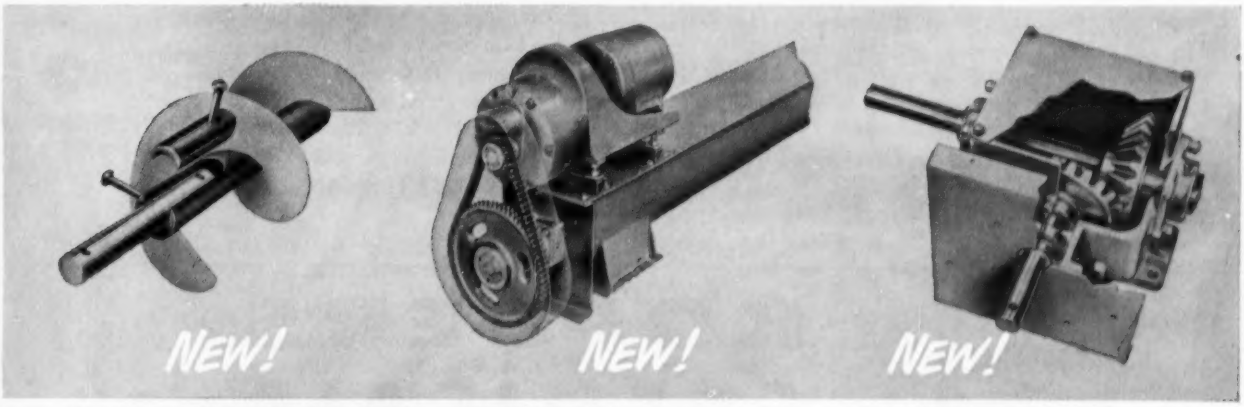
these NEW

LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.80 E

REDUCE FRICTION • CUT DOWNTIME • ANSWER DRIVE PROBLEMS

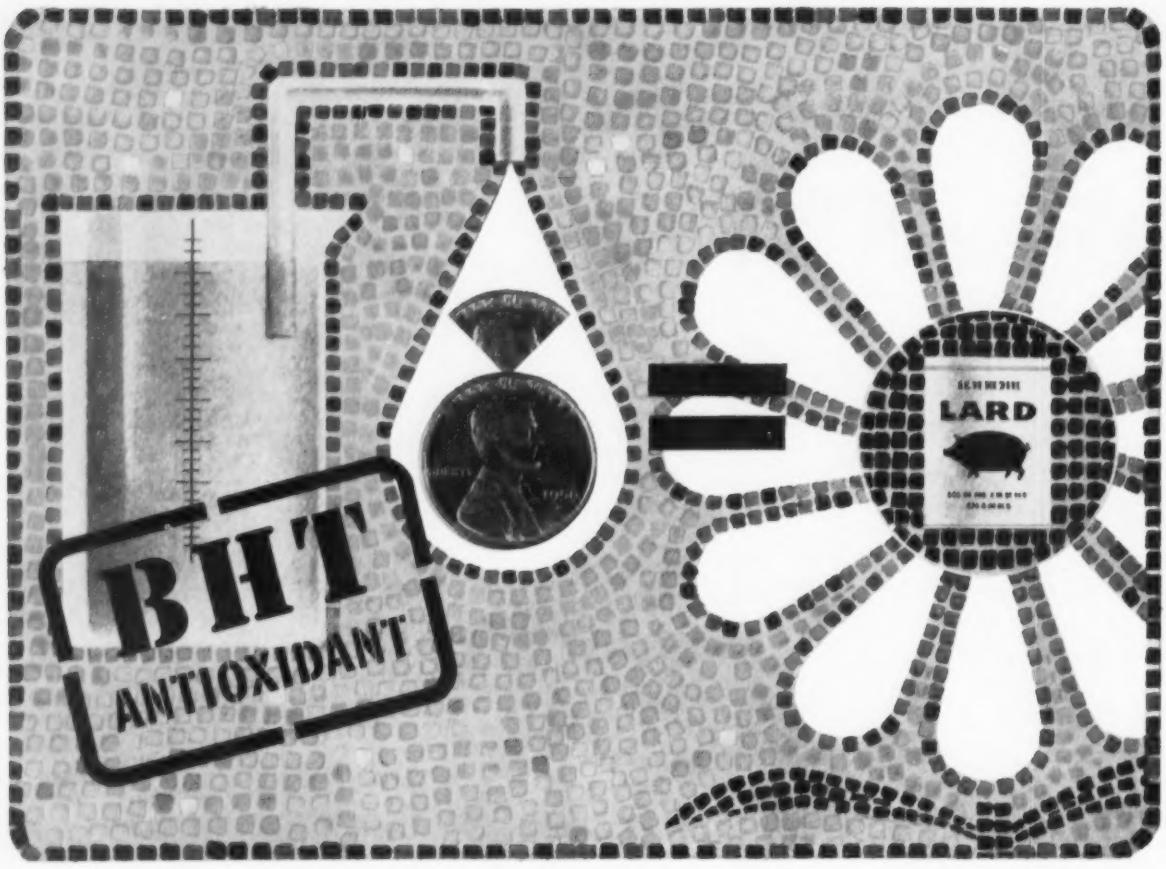


QUIK-LINK CONVEYOR SCREW is readily removed without disturbing other parts . . . saves time in replacing hanger bearings or other components.

LINK-BELT MOTOGEAR mounts on top of screw conveyor. Link-Belt also makes a full, pre-integrated line of gear and chain drives, couplings, bearings, etc.

ENCLOSED COUNTERSHAFT END connects two conveyors at right angles . . . permits use of right-angle drive. Drive shaft roller bearings take thrust in either direction. Ball bearings support countershaft.

For more data, circle this page number on card at back →



How Koppers BHT Antioxidant keeps 100 lbs. of lard fresh for just 1¼¢!

Accelerated oxidation tests in the laboratory show that Koppers BHT (butylated hydroxy toluene) is particularly effective in retarding rancidity in animal fats, using the Active Oxygen Method. The stability of 12 lards was increased from 3 to 6 times by the addition of just 0.01% of Koppers BHT. It costs a mere cent-and-a-quarter to give 100 pounds of lard this degree of protection against oxidation!

The same small concentration of BHT, when tested for carry-through activity by the Schaal Oven Test, increased stability of pastry, crackers, and potato chips from 3 to 6 times.

Koppers BHT is soluble in fats and oils . . . may be added directly to the fat during any of the processing steps, either in its natural white crystalline form or as a concentrate in a solvent.

Use of Koppers BHT Antioxidant in animal fats is permitted by the Federal Food and Drug Administration. Send for our new, free booklet #C-7-243. Koppers Company, Inc., Chemical Division, Dept. FE-57, Pittsburgh 19, Pa.

KOPPERS

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ADVANCES IN TECHNOLOGY

Non-Enzymatic Deterioration Of Dehydrated Pork

Palatability losses in dehydrated precooked pork appear to be due to a typical amino acid-carbohydrate reaction.

Sugars in mammalian muscle immediately after death are approximately 0.05% glucose and 0.05% glucose-6-phosphate as equivalent glucose.

As the glycolysis proceeds glucose-6-phosphate increases up to about 0.3% equivalent glucose and, if residual glycogen is available, free glucose and maltose accumulate up to 0.1-0.3% of all the fermentable sugars.

The sugar fractions produce a brown discoloration with either the protein or the non-protein soluble fraction of the meat, but the latter is responsible for the bitter, burnt flavor of dehydrated meats. The reaction can be inhibited by storing in a N_2 atmosphere containing 500 ppm. SO_2, or by fermenting the reducing sugars and glucose-6-phosphate in the solubles with a high concentration of yeast. Latter is removed by centrifugation, followed by recombination with the protein residue.

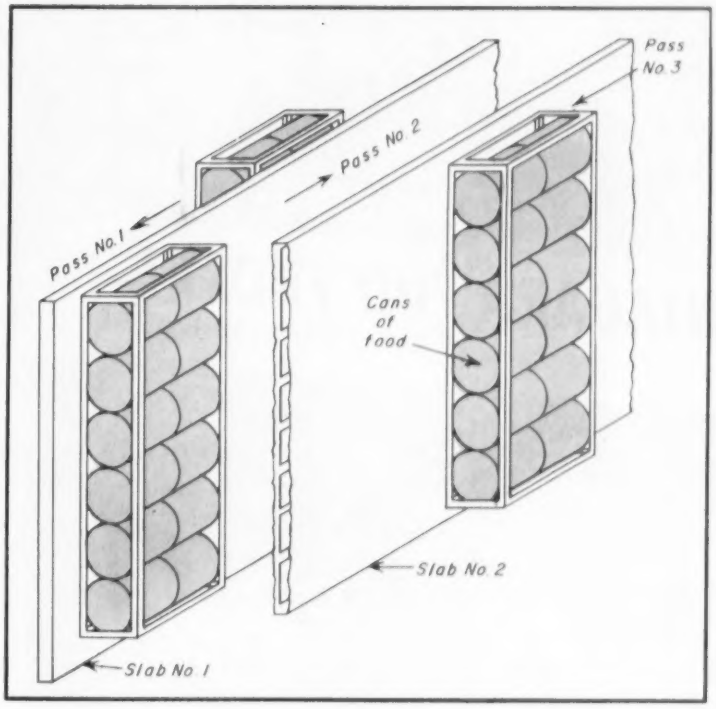
Reduction of color formation does not occur until the meat is reduced in moisture to the equivalent of 16% relative humidity or less. Extracts of the dehydrated pork deepen in color as the pH is raised from 3 to 7.—*J. of Science of Food & Agr.*, 8(10), 14-25, 1957.

Dehydrating Beans

Prefreezing is essential to successful dehydration of green beans. For it lowers moisture content of dried product, increases percent rehydration, and greatly improves appearance and acceptability.

Also important are: Use of bean size 4 or larger; dipping in solution containing 1,000 ppm. SO_2; and storage at about 72F.

Storage at 100F. causes a reduction in rehydration and loss of green color. More than 1,000 ppm. SO_2 in dip produces softening of tissues, and off-flavor.— *Food Tech.*, 229-31, April, 1957.



Three-Pass Packaged Food Irradiator Would Employ Flat Cobalt-60 Strips

A cobalt-60 irradiator for treating 3,000 lb. of food per hr. with minimum total dose of 2 + 16* rep has been designed by Brookhaven National Laboratory, Upton, N. Y. at the request of the Army Reactors Branch, AEC.

Facility was desired to treat food in cans up to No. 10's and V3 packages. As latter were larger than the cans, capacity, dose rate, and uniformity of radiation dose were determined for the packages.

It was assumed that cobalt-60 sources are available in flat strips approximately 10 × 0.8 × 0.03 in., and sealed in thick stainless steel. This limited design of source to a slab.

For preliminary design, an irradiator was chosen which consisted of 2 parallel slabs 24⅜ in. × 0.03 in. × 16.6 ft. Cans are to pass through the system 3 times (drawing above).

To distribute the dose as uniformly as possible, cans are to be pushed over sidewise when they come to end of each pass. Length of passes was determined from minimum dose rate and production capacity.

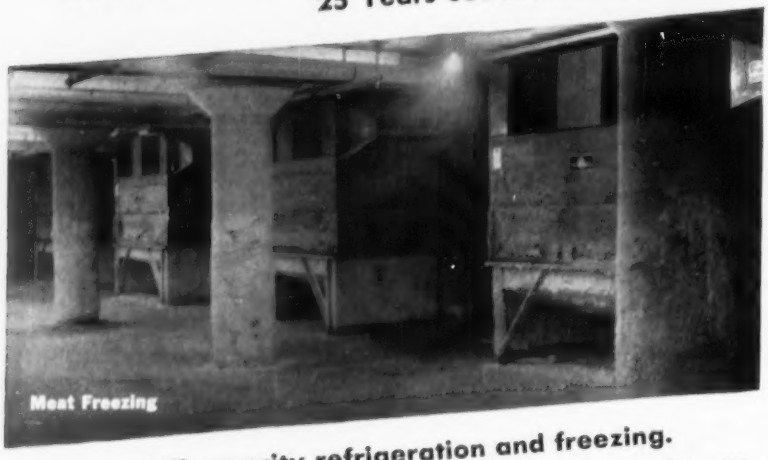
Width of sources was based on assumption that a 2-in. overlap at both top and bottom would result in a uniform dose distribution across the cans, and thus permit application of equations developed for an infinite slab source in an infinite medium.

Depth-dose rate equations for a point detector at various distances from an infinite slab were applied to this system, accounting for each gamma photon separately, and assuming exponential buildup to account for scattering. Equation for flux from an infinite slab source of constant specific activity was used to calculate radiation field.

To simplify calculations, cans were replaced by a rectangular package of

NIAGARA "NO FROST"

25 Years' Successful Experience



★ Always full capacity refrigeration and freezing.
★ "No Frost" removes moisture as fast as it condenses.
★ Save power, reduce costs; protect frozen food quality.

Write for Niagara Bulletin 105

NIAGARA BLOWER COMPANY

Dept. FE-5, 405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

Advances in Technology

width equal to 6 can diameters, and of thickness equal to dia. of one No. 2 can.

Total dose rate at various depths were calculated for a cobalt-60 source with a volume activity of 1 curie per cc., and plotted on semi-log paper. This curve was used to determine dose rate at several points in a No. 2 can as it traveled through the irradiator. From the required dose rate at center of can it was possible to calculate required specific activity of the source.

The conceptional design combines with the irradiation-chamber all necessary auxiliary facilities for safely unloading the sources and arranging them for use. A pit containing 14-ft. of water is at one end of the chamber. Contiguous to the facility are a number of water-filled slots which run beneath the irradiation chamber. It is from these slots that the sources are elevated to the chamber above when irradiations are performed.—Paper No. 57-NESC-86, Amer. Soc. of Mechanical Engineers, New York City, March, 1957.

Flash Pasteurization of Milk

Satisfactory pasteurization of milk can be obtained by fast heating and cooling without any intended holding time, and at temperatures easily reached with modern heat exchange equipment.

This is indicated by results of tests with suspensions of *E. coli*, *S. pyrogenes*, *Shigella paradysenteriae*, *Salmonella typhosa*, and *Corynebacterium diptheriae* in both autoclaved and raw milks.

Heating times of 0.25 and 0.50 sec. were used. Holding times of 0.05 sec. were inherent in the process. Under these conditions, a temperature of 175F. or less destroyed all of the above organisms.—*J. of Dairy Science*, 28-36, Jan. 1957.

Development of Bacteria

Milk exerts a selective action on bacteria, and for some commonly found in it provides a relatively unfavorable medium.

In samples obtained by aseptic milking, staphylococci, diphtheroid organisms, and mastitic streptococci were most common, but no thermodurics were found. Milks from individual farms had differing groups of bacteria dominating their flora, some

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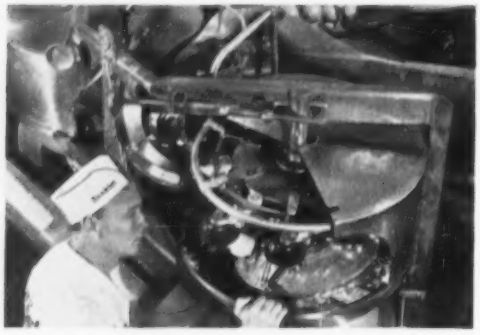
One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better



Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.

Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

Just three of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

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of which survived laboratory pasteurization.

Bulk milks had chiefly *S. lactis* and *Leuconostoc* species. Among those surviving pasteurization, *S. thermophilus* and *Corynebacterium lacticum* were most common. If raw milk is held at (50-72F.) the bacteria that grow most actively are, *S. lactis*, *Leuconostoc*, Gram-negative rods and staphylococci (in the early stages).

C. lacticum and other thermodurics do not find raw milk an ideal habitat, though they are commonly found in it because they colonize on rubber and metal surfaces of dairy equipment. In pasteurized milk actual growth of their species was delayed until other thermoduric bacteria started to multiply.

In laboratory-pasteurized milk the only organism capable of inducing rapid deterioration is *B. cereus* (including *B. mycoides*). Whenever it became numerous, clotting of the milk followed very soon afterwards.—*Canadian J. of Microbiology*, 203-13, Feb. 1957.

Bacterial Spoilage of Eggs

Shell eggs can be subject to severe losses from bacterial spoilage, and can harbor pathogenic microorganisms as well.

To determine whether spoilage organisms and fowl pathogens can become established and grow in the albumen or yolk eggs under adequately refrigerated storage, eggs within 24 hrs. of laying were inoculated with *Serratia marcescens*, *Pseudomonas fluorescens*, *Proteus vulgaris* and *Salmonella pullorum*. The first three of these are common egg spoilage organisms. The fourth is an important fowl pathogen.

Inoculations were made in both broken and shell eggs which were then held at 35.6, 50, and 68F. Only *P. fluorescens* grew at 35.6F. but *S. marcescens* remained fairly constant in the yolk and decreased in the albumen. *S. pullorum and P. vulgaris* decreased in both.

At the higher temperatures all organisms grew but the growth of *S. pullorum* was somewhat delayed. Only *S. marcescens* became established in the albumen.

Inhibiting factors seeem to prevent growth of bacteria invading egg albumen for 2 weeks or longer, but when they reach the yolk they grow rapidly. Visual examination of infected eggs does not reveal spoilage

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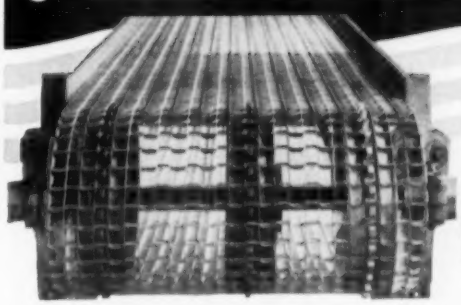

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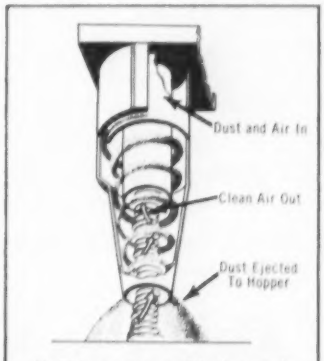

● This cutaway model of a single Microclone tube shows the operating principle of the minature cyclone.

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Advances in Technology

until there are several hundred million bacteria per egg. *P. fluorescens* can be detected by "black light" four days after an inoculum of 250 viable cells and storage at 68F.—*Applied Microbiology*, 355-359, 1956.

Byproducts From Cranberry Skins

Dried cranberry skins contain about 10% ursolic acid and about 12% wax composed of glycerides, free fatty acids and hydrocarbons.

Ursolic acid, an emulsifying agent used in pharmaceutical manufacturing, is a 5-ringed monocarboxylic acid with 7 methyl groups and a hydroxy group attached to the rings. It is soluble in hexane, ethylene dichloride, and ethylene trichloride which have been used to extract it from dried skins.

Continuous counter-current extractors of the type used for soybeans have been used successfully. Up to 12 lb. of extractables and 7.6 lb. of ursolic acid have been obtained from 100 lb. of dried skins which assayed 22% extractables and 10% ursolic acid. Costs are estimated at 37.5 c./lb. of extractables.—*Ind. & Eng. Chem.*, 360-63, Mar., 1957.

Methanol Content of Fermented Juices

Wines practically always contain small amounts of methanol, up to 200 or 300 ppm. This results from the minute amounts present in grape musts, and that produced by fermentation of glucose and levulose (0.04-0.06% of sugar weight). A Pinot Noir must, fermented without either stems or skins, developed 35 mg. methanol/l.; with stems present, 53-55 mg., with skins only present, 100-130 mg., and with both skins and stems present, 142-143 mg. Whether the juice was free-run or pressed from the crushed grapes made very little difference.

Color of the grapes makes some difference if juice alone is fermented. "Gros Vert", a white grape, yielded a must that fermented to a wine containing 13-14 mg. of methanol/l. With skins and stems present, methanol increased to 184 mg. Addition of 0.8 gm. of pectinase per l. of pressed juice reduced the methanol to 10 mg./l.

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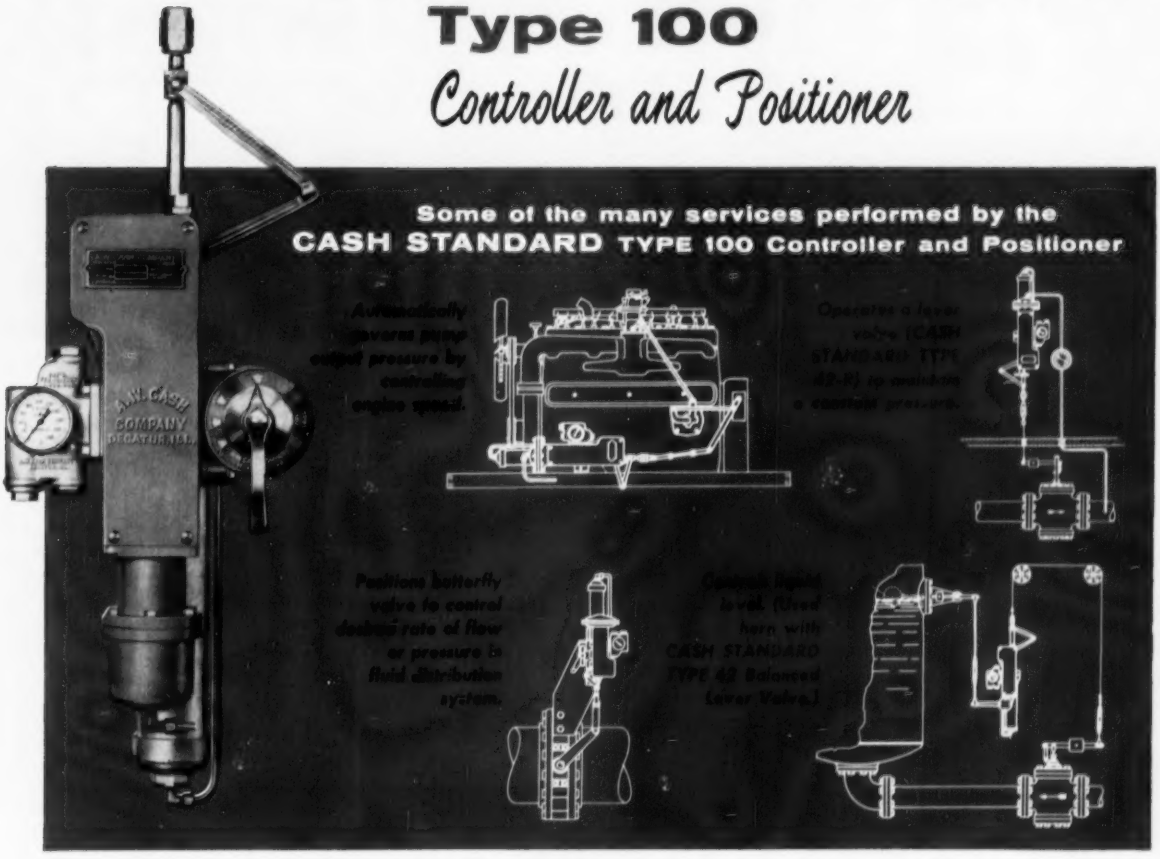
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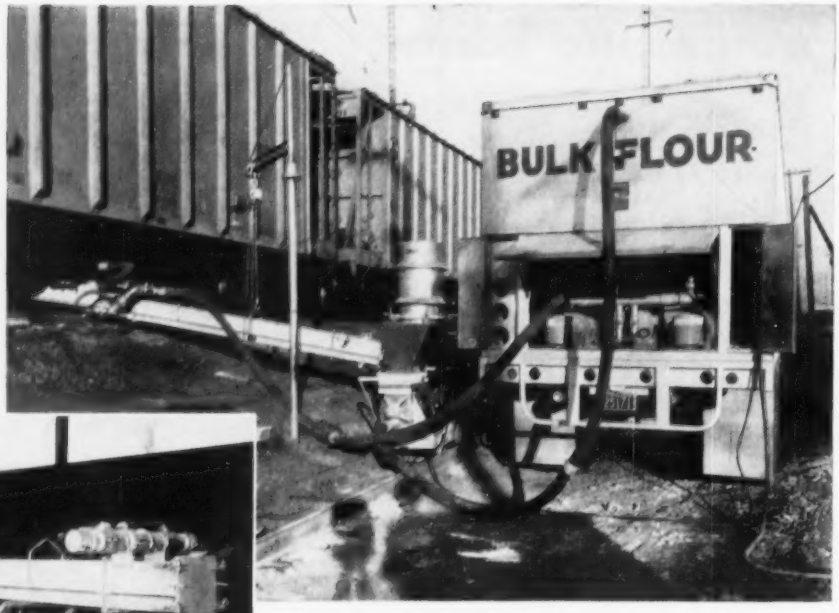
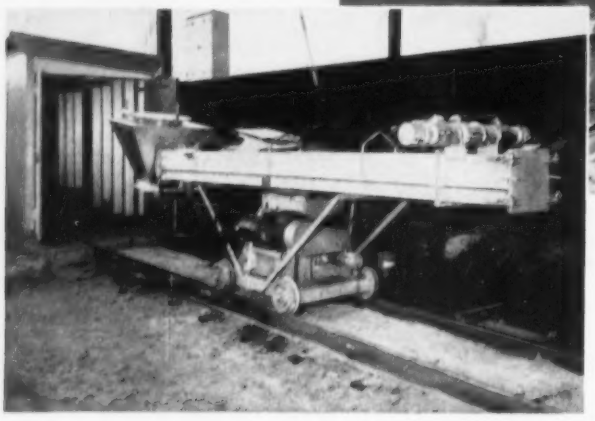


Clarke Bulk Transfer. Fuller Airslide transfer unit unloading flour from Airslide car to Fruehauf Airslide trailer. Mobile transfer unit is stored in shed when not in use.



Fuller solves unusual bulk flour transfer problems

When it's conveying of bulk flour, Fuller engineers have the answer, as they had for Clarke Bulk Transfer for delivery to bakeries in the Philadelphia area. An isolated and almost forgotten railroad siding was selected and put to use. The unusual relationship of the siding with respect to highway level posed a problem . . . solved by a transfer unit, consisting of a combination of the F-H Airslide®, Airveyor® equipment, and Fruehauf Airslide trailer. The transfer unit, mounted on a four-wheel truck at highway level, is moved on a narrow gauge track and connected to an Airslide bulk flour car for transfer of the cargo to the Airslide trailer. When not in use the transfer unit is moved into a small storage shed.

Store Door Delivery, Inc. Fuller Airslide transfer unit conveying flour from Airslide car on elevated siding direct to Fruehauf Airslide trailer.

Store Door Delivery, Inc. operates two Fruehauf Airslide bulk flour trailers serving three large bakeries in the New York Metropolitan area. Airslide bulk flour cars are spotted on an elevated track in the railroad yard. Rapid and sanitary loading of trailer is accomplished with the Fuller Airslide transfer unit conveying direct from cars to the trailer, illustrated on the left. A trailer of 20 tons capacity can be loaded in seven minutes.

When you have a conveying problem, call on Fuller.

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Wines made from apples, pears, plums, and cherries have as much or more methanol than grape wines. Distilled liquors made from wines may have their methanol levels raised considerably in the process—up to several thousand ppm. in brandies distilled from wines fermented from grape marcs.—*Revue des Fermentations et des Industries Alimentaires*, 11(6), 279-86, 1956. (In French.)

Flavor, Aroma Substances In Roasted Cocoa Beans

Aqueous methanol (80% by volume) extracts of defatted roasted cacao nibs contain substances that can be separated by lead acetate precipitation and the use of ion exchange resins, and analyzed by paper chromatography.

Lead acetate precipitates polyphenolic coloring matter and part of the "caramel bodies", the later being high-polymer substances probably arising from drying and roasting of the beans.

Cation-exchange resins remove amino acids, amines, and melanoidins. Some of materials have unpleasant fishy aromas. Paper chromatography of cation-, anion-, and sugar-fractions gave numerous spots representing known amino acids and several unidentified carbohydrates. The quantities of caramel bodies, melanoidins, and odorous materials are highly variable, and their composition is highly complex.—*International Chocolate Review* 82-86, March (1957). (English, French, and German.)

Poultry Retain Light Color When Immersion Frozen

Optimum appearance of frozen chickens and turkeys is obtained by immersing in −20F. liquid for a minimum of 20-40 min., depending on weight of the bird, then storing at −20F.

The uniform light-colored, chalk-like appearance of such birds is mainly due to opacity of the frozen skin rather than to a change in color.

These are the findings of experiments in which 4-6 lb. chickens and 14-15 lb. turkeys were scalded at 128-30F., eviscerated, cooled to 32-35F., and vacuum packed in Cryovac before freezing. Methods employed for freezing were: (1) immersion in

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Advances in Technology

50% methanol at +10F. to −40F.; (2) spraying with liquid at −10F., and (3) air blasts at −40 and −100F. (without bags).

When initial temperature of poultry was 100F., instead of 32-35, immersion time was increased and skin was not as opaque. Spraying had a similar effect, and freezing time was not significantly influenced by variations in pressure between 20 and 60 psig.

A −40F. air blast produced birds of fine, light, uniform color, but the skin was not as opaque as that of immersed birds. The −100F. blast gave an appearance similar to immersion.

Attractive appearance was retained in storage at +20F. for 2 weeks, at 0F. for 6 weeks, and at −20F. indefinitely.— *Food Tech.*, 247-50, April, 1957.

Effectiveness of Bone Char

Factors influencing the decolorizing effect of bone char on sugar solutions were the object of studies made in an experimental apparatus arranged to collect effluent fractions on chars of different particle size, with different liquor-char contact times, and with different sugar liquors.

Results showed that:

1. Volume of liquor decolorized to a predetermined standard increases rapidly with decreasing mean aperture (M.A., length of side of square through which 50% of the char will pass).

2. Optimum rate of liquor flow increases with decreasing M.A.

3. With refinery stock chars, the quotient $M.A./t_{v\text{-}max.}$ is constant, where $t_{v\text{-}max.}$ is the time for maximum volume of decolorized liquor to flow through a char of given M.A.

4. Volume of decolorized liquor increases as t_v increases from t_o to $t_{v\text{-}max.}$

5. Volume of liquor decolorized varies approximately as the square root of the color (in degrees Lovibond) of the raw liquor.

6. Volume decolorized decreases as the ash content of the liquor increases.

7. Potassium in the raw liquors inhibits decolorization more than calcium. Chlorides and sulfates inhibit less than the aconitate ion.—*J. of Applied Chemistry*, 7(2), 49-63, 1957.

Vitamin E Activity Reduced In Bleached Flours

Treatment of flours with ClO_2, or use of the aeration process destroys most of the tocopherols present.

An untreated flour contained 1.57 mg. of tocopherols per 100g. This was made up of 0.35 mg. alpha, 0.08 mg. each of beta and zeta, and 0.81 mg. epsilon tocopherol. The vitamin E activity of this flour was 0.60 mg. per 100g. of which 0.35 mg. was due to the alpha-tocopherol.

Treatment of the flour with ClO_2 destroyed most of the tocopherols, reducing the total to 0.19 mg. per 100g. with an equivalent activity of 0.04 mg. of vitamin E. A diet consisting of substantial amounts of untreated flour furnished sufficient vitamin E for rats but the animals showed vitamin E deficiency when ClO_2 treated flour was substituted.

Bread baked with untreated flour contained 1.82 mg. of tocopherols per 100g., had 1.16 mg. (dry basis) after baking, a 36% loss, corresponding to a 47% loss of vitamin E activity.

Breads baked with $KBrO_3$ or ascorbic acid added to the flour preserved their vitamin E activity practically unchanged.—*J. of Science of Food & Agr.* 8(2), 97-104, 1957.

Sparkling Beverage Jelly

Making jelly from champagne or any other sparkling beverage is the subject of a patented method, the product of which contains bubbles and otherwise simulates the beverage in appearance as well as in flavor.

In practice the sparkling beverage is allowed to stand exposed to the air long enough to become degasified and flat. It is then used to flavor a jelly prepared in the usual manner from sugar, pectin, and citric acid. Latter materials are mixed and brought to a boil before beverage is added. This aids in retaining the delicate flavor and bouquet of the wine.

The jelly is then allowed to cool to a point where it is sufficiently viscous to hold air bubbles. Then it is poured into glass containers with enough agitation to create air bubbles, after which container and contents are quickly cooled and stiffened.

Several other methods of introducing bubbles may be used, ultimate object being to give the product appearance of the genuine beverage forming the base flavor.—U.S. Patent 2,778,737, Jan. 22, 1957.

CASE HISTORY:

Stokes & Smith - 'EG' Filler
C. W. Antrim & Sons, Inc.
Richmond, Virginia
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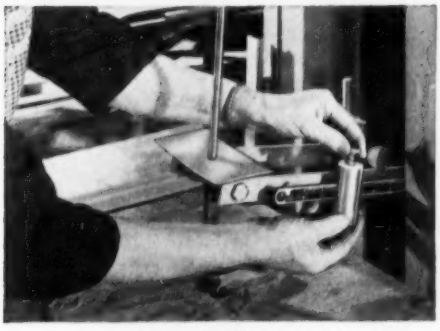
brand spices

Rapid changeover increases daily output of short production runs



One simple adjustment on the scale beam changes the net fill to the desired weight, accurate to within 1/16 ounce plus or minus per pound. This adjustment is made by the operator without moving from the filling station.

"Our Stokes & Smith 'EG' Filler makes it possible to package our spices in sizes ranging from 1 to 16 ounces with 25% less changeover time than required by our previous equipment. This feature alone assures rapid filling of small orders which make up much of our business in pepper, cinnamon, nutmeg, cloves, allspice, chili powder and ginger. And by holding net weights to within 1/16 ounce per pound accuracy, it also eliminates time-consuming check weighing."

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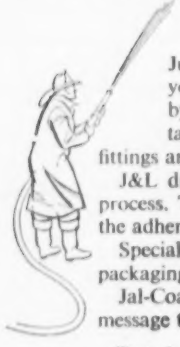

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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Wants to Freeze Salads

Question—Do you know if frozen egg, ham, chicken and tuna salads are now being marketed? Have you formulas for these four types of salads that might be frozen and packed in 8-oz. polystyrene containers with polyethylene lids? Will they hold up during freezing and 0-F. storage?

MARCH PROBLEM

Spaghetti and Meat Balls

The Question Was—Have you a good formula for putting up spaghetti and meatballs in 401 x 211 cans?

Answer—Actually there are three preparatory steps prior to canning. They are: Making up the spaghetti, the meat balls, and the sauce.

The Spaghetti—Blanch at least 25 min., 224 lb. of spaghetti (dry).

The Meat Balls—Blend 252 lb. of ground beef (through ¼-in. plate), 17.5 lb. of fresh whole eggs, 0.7 lb. of dehydrated onion chips (soaked to 2.8 lb), 1.4 lb. of dehydrated celery, 1.4 lb. of dehydrated red and green pepper (soaked to 6.3 lb.), 3.5 lb. of salt and 36.4 lb. of granular wheat flour.

The Sauce—Cook up 19.6 lb. of sugar, 23 No. 10 cans of tomato paste (36% solids), 21.0 lb. of salt, 12.6 lb. of corn oil, 6.3 lb. of olive oil, 6.3 lb. of starch, 2.8 lb. of amioca starch, 1.05 lb. of MSG, 3.5 lb. of meat extract, 2.8 lb. of onion powder, 7.7 oz. of soda, 4.9 oz. of bay leaf seasoning, 4.9 oz. of allspice seasoning, 7.7 oz. of pepper cream (Stange), and 4.9 oz. of pepper flavor. Make up sauce to 105 gal.

Fill into 401 x 211 cans, 5¼ oz. of spaghetti, four meat balls (2⅝ oz.) and 180-F. sauce (to fill can). Process 40 min. at 250F.

Air-Borne Contamination

Question—As our business has grown from rather modest beginnings, we have added several different food items to our line. All are processed in one large one-story building. Recently, we had a little trouble with spoilage, and this raised the question of possible air-borne contamination.

We hesitate to start dividing up our large processing area because of problems that would be created in materials handling, adequate supervision, etc. What can we do to determine to what extent air-borne contamination might be a factor in this case? If we could accumulate facts—instead of proceeding on the basis of theories—we might have something upon which to base corrective action.

Answer—There is a method of collecting air samples for bacteriological anaylsis. It involves use of an air centrifuge fitted with suitable bottles (Fischer Scientific Co., International-Wells Air Centrifuge No. 5-467).

We suggest that you acquire this device and collect air samples at key points throughout the processing area. By thus standardizing conditions of air sampling, you can relate the amount of yeasts, molds, etc. likely to be present. In other words, you can more or less map the conditions and spot any potential trouble makers.

Of course, we know nothing of the environment of your particular plant. But we suggest you do not overlook the possibility of outside contamination via ventilation as well as cross-contamination between different products within the building.

Correction (assuming air-borne organisms are located in sufficient quantity to be harmful) could be carried out by either of two methods. And the choice would depend upon actual local conditions.

You could either segregate and partition off operations where contamination is most severe, provided it is not too extensive. Or you can do the same thing for operations most susceptible to contamination. However, such operations should represent only a small part of your total production.

Segregation in this manner is the first step, but it might then prove necessary to take further action to destroy the air-borne organisms. This might be accomplished by any of several methods, depending upon types of organisms present, degree of removal desired, economics, etc.

Air filters, ozone generators, ultraviolet lamps, etc. might be considered. One possibility that has very recently come to light is the use of the type of air-conditioner which controls humidity by means of a chemical solution sprayed into the air. This has been found to do quite an effective job of air sterilization as an extra "bonus."

Inspecting Lights

Question—With greatly increased emphasis in our organization on product quality and appearance, we're doing more and more organoleptic testing of our products. We've observed that it is often difficult to obtain consistent results on appearance evaluations and, particularly, on color judgments.

We believe this may be due, in part at least, to lack of standardized conditions for inspecting samples. This has brought up the question of lighting. Is there any lighting equipment suitable for a test room that's been designed with the study of food products in mind?

Answer—There are special lighting units for food inspection and color comparisons that should prove valuable to you. They can be obtained with different fluorescent or incandescent lamps emitting in color ranges of 2,800, 3,800, 4,500, and 7,500 deg. K. (Kelvin). Latter is generally recommended for food-industry grading and inspecting.

Proper intensity of light is signifi-

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

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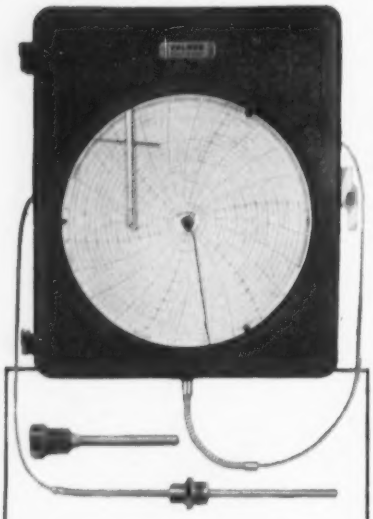
recorders

Into this modern Mercury Actuated Recorder has gone all the skill of Palmer master craftsmen.



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Cincinnati 12, O.

Questions & Answers

cant, especially if you want to see how your products will probably appear in today's modern supermarkets. Store lighting may go up to 50 ft.-candles, and these lighting units will easily produce 60 ft.-candles when banked over your test table at an elevation of about 6 ft.

One feature about lights specially designed for inspection purposes is that they are equipped with special ballasts, which maintain sufficient voltage control for uniform illumination. Their manufacturer recommends that such test lamps be replaced about every 5,000 hr. to maintain standard rated color temperature and intensity.

One advantage of standardized lighting not to be overlooked is putting different plants or laboratories on the same basis if you ever plan to operate in more than one location. Such standardization will go a long way to eliminate differences in grading of similar samples by different testing groups.

Which Refrigerant to Use?

Question—Would you recommend ammonia or Freon as a refrigerant?

Answer—Size of plant and application should influence your choice. Off hand, it appears that Freon is used in compressors up to 5 hp. and ammonia in larger-horsepower units. However, there are Freon units on the market above 5 hp. For a multiple compressor or multiple-room set-up, ammonia seems to be favored.

Freon is non-toxic and cheaper than ammonia. However, because of ammonia's strong odor, an ammonia leak can be immediately detected, and corrective measures can be taken before it becomes harmful to personnel or products.

Barbecue Sauce

Question—You had a barbecue-sauce formula in the February issue of FE (p. 168). Would you have another one with a more pronounced barbecue flavor?

Answer—It's tough coming up with the exact formula you want for we do not know your specific needs or market aims.

Anyway, here's one that has more of a barbecue flavor than the one published in February:

Formula consists of tomato paste (30% solids), 1 lb.; sugar, 12 oz.; vinegar (50 gr.), 1 pt.; salt, 2½ oz.; starch (low-temperature thickening), 2 oz.; barbecue seasoning, ¼ oz.; and water, 3 qt.

To prepare, mix 1 qt. of the formula water and starch into a slurry. Blend tomato paste, sugar, salt and vinegar, and then heat.

During heating, add starch-water slurry, and continue heating until starch develops. Finally, add the seasoning.

Should you wish to make a barbecue-meat mix, add 10 lb. of well shredded beef, pork, or chicken, and heat.

Hamburger and Macaroni

Question—What assistance can you offer me in the preparation of a ready-to-heat-and-eat frozen hamburger and macaroni casserole to be packed in rectangular foil trays?

Answer—Try out this small batch to see if it is satisfactory with you:

Saute in small lab-size steam-jacketed kettle until brown, 3¾ lb. of chopped onions in 12½ oz. of margarine. Add 22½ lb. of ground beef, and continue to brown until meat is reduced to small size pieces. Now introduce into batch 15 lb. of canned tomatoes, and cook, at low simmering heat, for about 1 hr.

Cook 4¼ lb. of macaroni in about 7½ qt. of water containing 3 oz. of salt. Drain and wash blanched macaroni.

Combine macaroni, 7½ lb. of beef stock, 2½ oz. of salt, and ½ oz. of ground pepper. Add meat-onion mixture, fill into foil trays and freeze.

Canal By-Pass for Retorts

Question—We operate several long lines of canning retorts, which feed into cooling canals by the usual overhead tramrail and hoist. In cycling retorts throughout the day, there is a remote chance that a retort crate might accidentally be carried into the cooling canal without first being cooked.

We do all we can to prevent this by careful training of hoist and retort operators, but would like, if possible, to find some way to prevent such an error by a positive mechanical safeguard. Can you help us?

Answer—In seeking some property of the product to check, we conclude that it should be temperature of the crate and contents as they

taste appeal for the calorie-conscious *equals* specialty food sales!

● More than 35 million Americans live today on low calorie or salt and sugar-free diets. For either health or cosmetic reasons, this group is steadily increasing . . . and with it the market for dietetic and low calorie foods. Providing taste appeal for foods lacking either sugar or salt—and sometimes both—is an extremely difficult problem, and flavor differences in some degree are inevitable. However, the flavor chemist can, by diligent research provide an acceptable flavor for such foods . . . within the necessary dietary limitations. Each is an individual problem, however, and must be resolved by specific means in the laboratory. D&O has done extensive work in the flavoring of dietetic and low calorie foods and beverages and will place this experience at the service of manufacturers planning to enter the market. Inquiries are invited.

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Walworth plastic valves and fittings are made of non-aging, non-corrosive and non-toxic unplasticized rigid polyvinyl chloride (PVC). These products are highly resistant to chemical attack and offer the advantages of immunity to galvanic corrosion and high impact strength at temperatures as high as 150° F. Durable and light, Walworth PVC valves and fittings are simple to install, easy to maintain (no painting), and add a smooth, clean appearance to your piping system.

Walworth PVC Y-Globe Valves are designed to regulate the flow of alkalies, acids, and similar corrosive fluids. Walworth PVC Diaphragm Valves* are commonly used in systems handling corrosive fluids, especially those containing suspended materials, and can be furnished with diaphragms suited to your application.

*Hills — McCanna (Saunders Patent)

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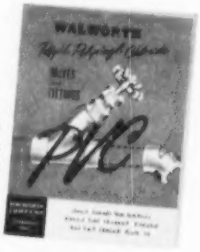

SEND FOR THIS BOOKLET. It describes mechanical and thermal properties, working pressures, sizes and dimensions, application and assembly data for the complete line of Walworth PVC Valves and Fittings. Please use company letterhead.

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are about to enter the canal. If retorting has been carried out, this will be very close to formula-cooking temperature. If retort has been accidentally skipped, it will be somewhat lower than filling temperature of product.

In the latter case the crate was filled with hot cans while at room temperature, and some time has elapsed since filling. We believe that the two temperatures—if retorted, and if not—will be far enough apart so that there could be no mistaking one for the other.

We therefore suggest that you provide a temperature-sensing element at each canal-loading station, and position it so that every cage must slide along it before entering the water. This element should be a quick-responding one. It's best to consult with instrument manufacturers in selecting a suitable unit.

The signal should be transmitted to a controller set for the desired temperature. If the crate contents have not been cooked, instrument will detect the low temperature.

Ketchup-Query Legal Point

In the problem "Ketchup Darkens" (FE Apr., p. 209), the questioner makes parenthetical reference to use of sodium benzoate in ketchup.

I would like to call attention to the fact that this ingredient is not permitted under current FDA regulations.—*B. Buchalter, Sanitation Consultant.*

Prepared Spanish Rice

Question—Do you have detailed instructions for preparing Spanish rice to be packaged and frozen in disposable, heat-and-serve type of aluminum trays?

Answer—Cook 20.5 lb. of rice in salted water until almost tender, drain and wash. Saute in jacketed kettle until tender, 5 lb. of chopped onions, 5 lb. of chopped green peppers, and 2½ lb. of bacon fat (chopped).

Bring to boil, 30 lb. of tomatoes, 30 lb. of tomato puree, 1¼ lb. of salt, 0.87 oz. of ground pepper, 0.87 oz. of chili powder, 7½ oz. of sugar, 1 oz. of mustard powder, pinch of cayenne, and 5 oz. of Worcestershire sauce.

Mix all ingredients with rice, fill into aluminum foil trays and freeze.

Note: Label instructions on package: Bake 30 min. at 350F.

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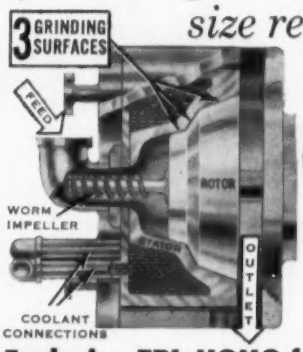

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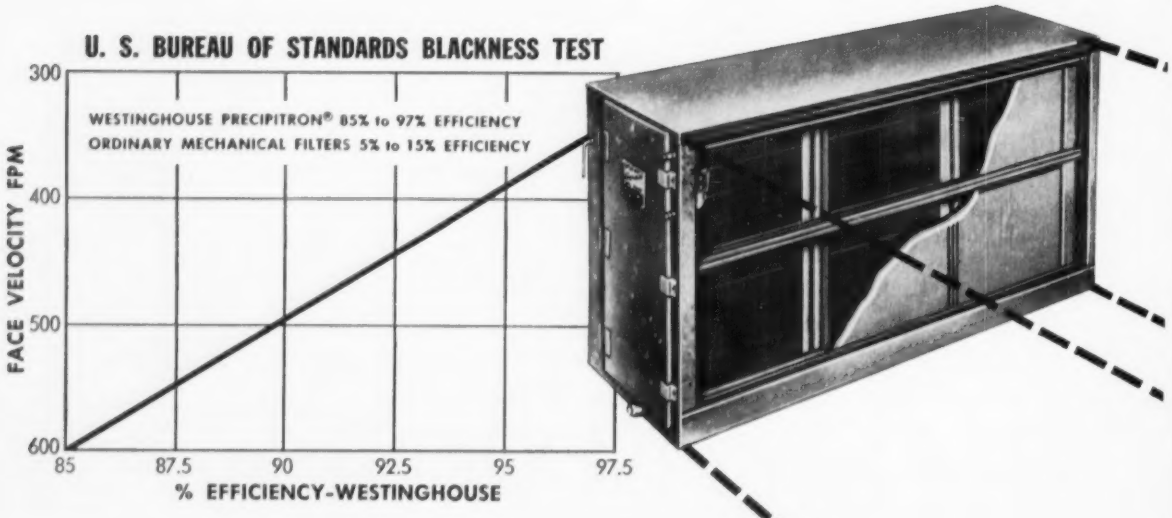
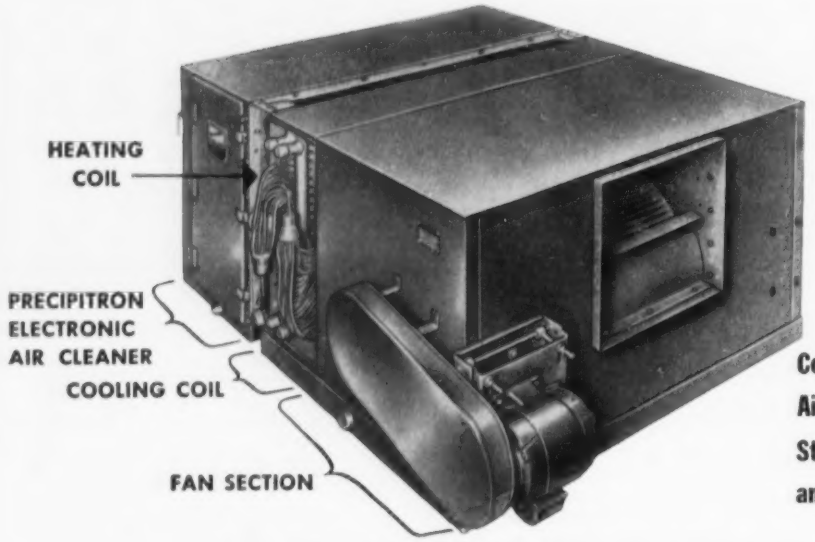
NEW "In-Line" electronic air unit air conditioning





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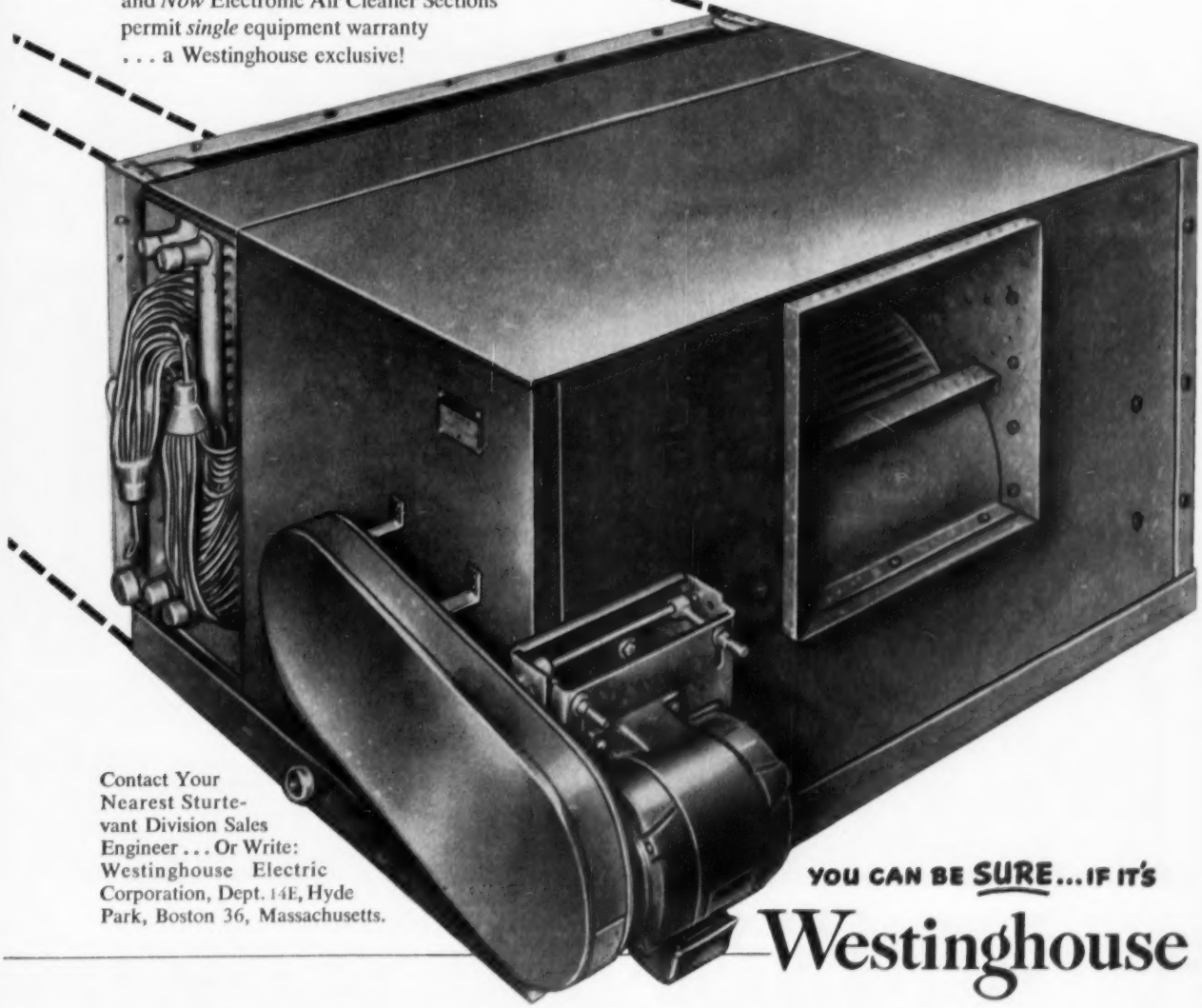
Westinghouse manufactured fans, motors, heating and cooling coils, and *Now* Electronic Air Cleaner Sections permit *single* equipment warranty . . . a Westinghouse exclusive!



Contact Your Nearest Sturtevant Division Sales Engineer . . . Or Write: Westinghouse Electric Corporation, Dept. 14E, Hyde Park, Boston 36, Massachusetts.

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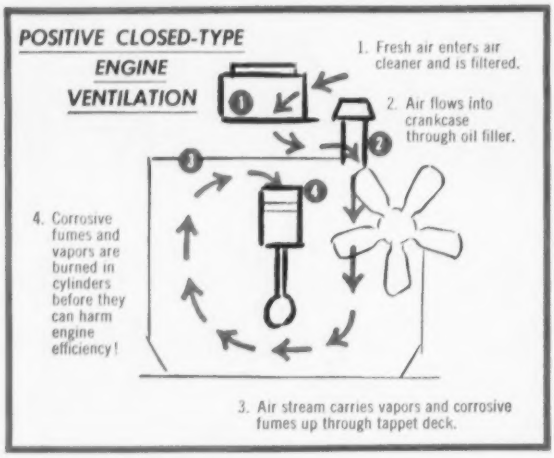
"CLEAN LIVING" GIVES A CHEVY ENGINE LONGER LIFE!

. . . more evidence that Chevrolet Task-Force trucks are engineered better and built better for bigger savings!


POSITIVE CLOSED-TYPE ENGINE VENTILATION
1. Fresh air enters air cleaner and is filtered.
2. Air flows into crankcase through oil filler.
3. Air stream carries vapors and corrosive fumes up through tappet deck.
4. Corrosive fumes and vapors are burned in cylinders before they can harm engine efficiency!

This drawing shows, roughly, one of the ways in which Chevrolet truck engines minimize a major cause of wear—dirt! Now consider this additional evidence that Chevy heavy-duty V8's and 6's "live clean" and bring you fleet, dependable power that costs less to use!

Extra filters give extra-clean fuel—Only *clean* fuel reaches the engine—that's one reason you can depend on a Chevrolet truck! All fuel is filtered twice (once in the fuel tank and again in the carburetor) to keep dirt and water from hampering efficient operation. Chevrolet truck V8's provide a *third* filter, at the carburetor, for triple protection!

Oil stays clean longer, too—Chevrolet truck V8's and 261-cu.-in. 6's come equipped with modern high-capacity oil filters (V8 filters are of the Full-Flow type). These engines keep *clean* oil flowing to moving parts; parts wear less and last longer because of it!

Even the air is cleaner—Dust and foreign matter in the air an engine "breathes" can reduce engine life by years. Chevrolet minimizes this wear-producing factor by providing big oil-bath air cleaners as *standard equipment* on all truck engines.

These are sound under-the-hood reasons why a Chevrolet truck will *stay* on your job and *save* on your job. There are others, too, including short-stroke V8 design (shortest stroke of any truck V8's!) and 6-cylinder engine design that puts out more power than any other in the field. You'll learn about them all when you visit your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Biggest sellers . . . because they're biggest savers!

CHEVROLET TASK·FORCE 57 TRUCKS

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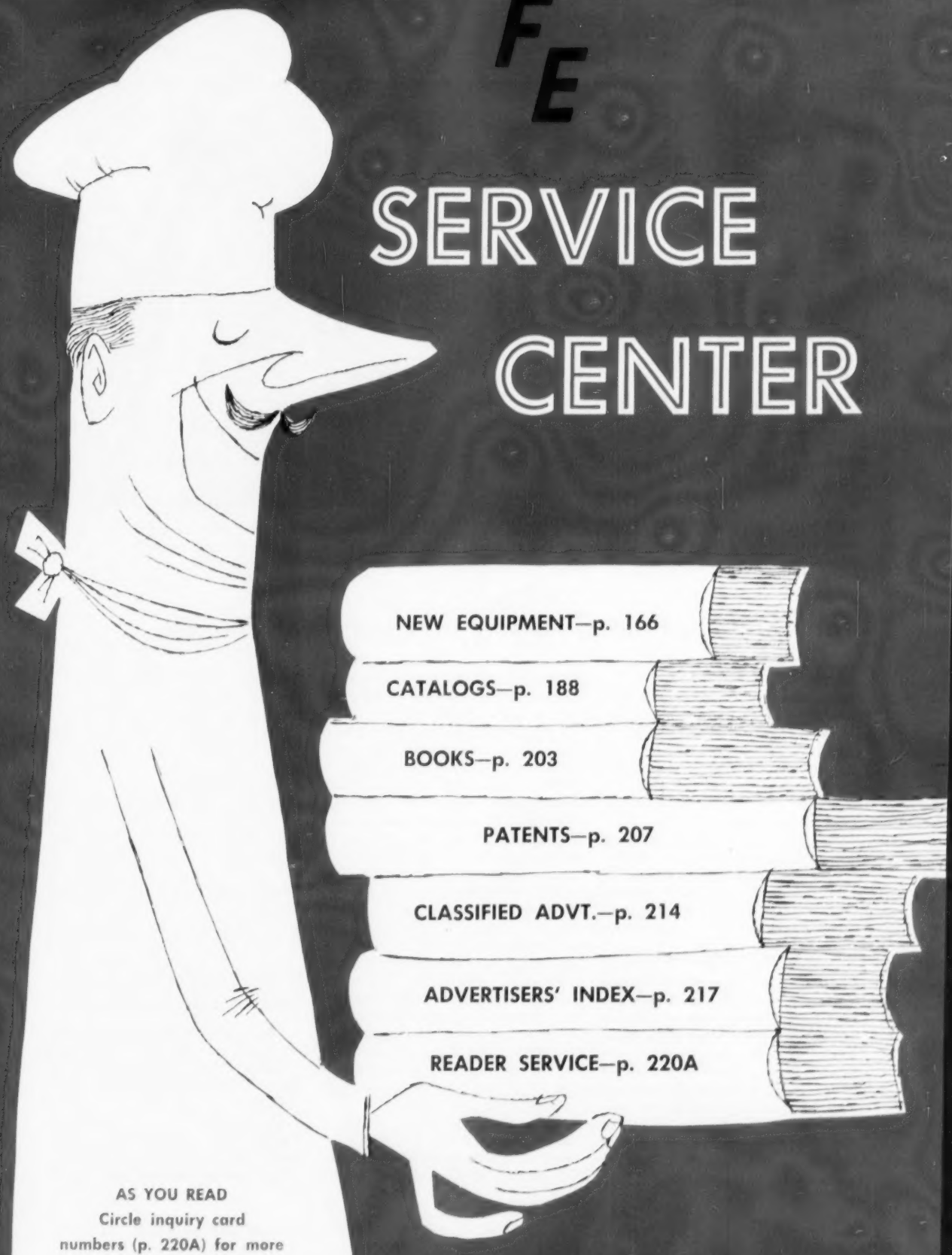

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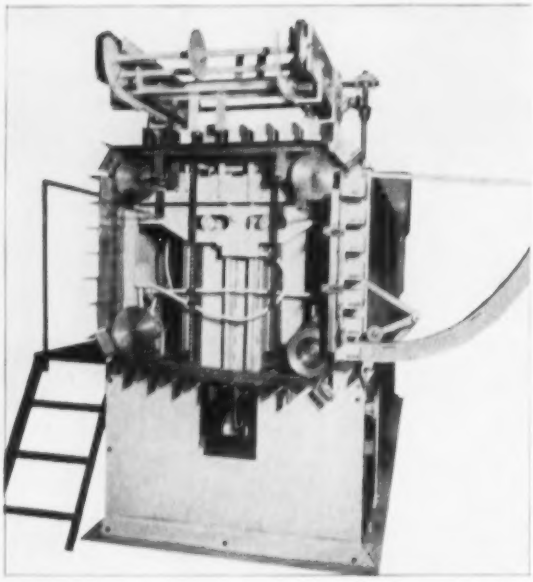
NEW EQUIPMENT & SUPPLIES



FEED END of continuous vertical-plate freezer shows conveying system that delivers unfrozen cartons to top of unit. Ammonia-refrigerated plates are at —40F.

AT TOP, cartons are held in a "ready" channel. Pressure plates open for 3 sec. to admit a tier of packages, while discharging the bottom row.

Vertical-Plate Freezer Offers Efficient Heat Transfer

Providing automatic feed and discharge of carton-packed foods, this continuous vertical-plate freezer offers maximum heat exchange for any given refrigerant temperature and velocity. Furthermore, it reportedly does not require an insulated enclosure for efficient operation at ambient temperatures.

This efficiency is attributed to an advanced design that utilizes 100% of conductive surfaces and eliminates distortion of cartons. Unit permits adjustments for duration of freezing cycle, pressure between plates and cartons, and various-sized cartons.

In operation, a mechanical feed system (left photo) delivers horizontal tiers of packages to top of freezer, while frozen cartons are discharged from the bottom. Entering tiers are held in a "ready" channel (right photo), positioned above each package column. Shearing action of the ammonia-refrigerated plates (at —40F.) discharges bottom row of cartons and permits entry of unfrozen packages at top.

In receiving and discharging cartons, plates open for only 3 sec. Thus exposure of refrigerated surfaces to air is minimized—a controlling factor in permitting operation under ambient conditions. Packages pressure-contact the plates during freezing to prevent frost accumulation and to provide rapid heat transfer.

Here is the 3-sec. cycle:

First, plate pressure is hydraulically released to allow free movement of cartons downward between the plates. Next, packages drop a tier as a new row is loaded from the top. Finally, plates close and rise to discharge the bottom tier.

Freezers are available with 5-9 plates for handling 4-8 rows of packages. For example, a 9-plate unit will accommodate 15 tiers of pint ice-cream cartons in 8 rows, 42 packages per row, or a total of 5,040 pints. With 800 sq. ft. of pressure-contact area, it has a capacity of 600 gal. per hr.—*Cyclomatic Freezing Systems, Inc., 1313 N. State St., Chicago.*

Circle 166A on Reader Service Card

Want More Information

It's free — and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

N-M-R Unit Rapidly Gages Food's Moisture Content

Employing hydrogen's properties of nuclear magnetic resonance (N-M-R) a new instrument measures moisture content of foods quickly and accurately.

Unit (NMR Analyzer) uses a spectroscopic method to quantitatively detect the number of nuclei of a given atomic species (see FE

Apr. '56 p. 56 for theoretical details). Sample need not be hydrogen-free in the solid phase, since amplitude lines representing these protons are easily distinguished from lines of those in the liquid phase.

To date, unit has been used for determining moisture in corn starch and similar products. Here, measurement accuracy is about 0.1% over a range of 4-16% moisture content. A calibration curve is required for each different product, but once this is available, a determination takes only 30 sec. Sample size is about 30 c.c.—*Schlumberger Well Surveying Corp., Ridgefield, Conn.*

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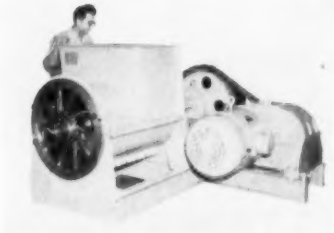


Frozen-Food-Block Slicer Handles 10 Tons/Hr.

Higher output, better particle-size control, and reduced hazards to operators are advantages cited for this compact block slicer.

Called RE-24 Extructor, it is designed for efficient slicing of 120-lb. charges of meat, meat byproducts, eggs, vegetables, or fish. Blocks may be frozen, thawed, or partially thawed.

On 100-lb. meat blocks, for example, it operates at better than 10 tons per hr. Unit uses 30 hp. at 22 rpm. in reducing these blocks to 2-3 in. size (average) in about 15 sec. Unindexed blocks may be fed in any position without bridging or choking, and continuous processing requires only linking the machine to a grinder for final sizing.

Cleaning is simplified by easy access to unit's welded blades and anvils, and crevice-free interior. Machine occupies about 45 sq. ft. of space, including the drive.—*Rietz Mfg. Co., Santa Rosa, Calif.*

Circle 167A on Reader Service Card

Compact Net Weigher Has Product Versatility

This precision net weigher is designed to economically replace manual or semi-accurate mechanized weighing where—

1. Production of any one item does not justify a single-purpose machine, or

2. Variety of products and packages produced can be handled only by a multi-purpose unit requiring complicated changeover entailing costly shutdown.

Known as Junior Weigher, this compact unit automatically weighs and fills a variety of free-flowing and semi-free-flowing products into bags, boxes, jars, or cans. Weight range is 1/2-16 oz. at speeds up to 20 per min. Machine is housed in a stainless-steel cabinet occupying about 11 sq. ft. of floor space.

Changeover for different products, weights, and package types requires a minimum of time and effort. It takes about 30 sec. to replace a snap-on discharge spout in changing from one type of package to another, about 1-4 min. to change charge weight, and approximately 5 min. to change from one type of product to another.

Another versatility factor is interchangeability of two types of weigh buckets. For products such as hard candies that mar or scuff, a flexible Mylar bucket is provided. For less fragile items, an aluminum bucket is used.

In operation, product is poured into machine's overhead hopper, from which it is gated into a vibratory feeder having a trough for feeding bulk and dribble charges. Overhead hopper may be removed to allow feeding from a conveyor.

Cut-off gates stop the flow from bulk and dribble areas as charge in weight bucket approaches and reaches correct figure. (Bucket rests on a special weighing element.) Weighed product is then discharged into bag or container through spout. —*Wright Machinery Co., Durham, N. C.*

Circle 167B on Reader Service Card

Electronic Unit Records Individual Package Weight

Precise control of package overfill is offered by a new automatic check-weighing unit that indicates and records weights as light as 0.1 oz.

Known as NC. 630 Solarcheck, it incorporates an analogue-to-digital converter for indicating 4-5 weighings per sec. Accuracy is reported at

CUT OUT AND FILE

Now — A Revolutionary NEW Steam Trap!

INSTALL IT — FORGET IT!

ACTUAL SIZE

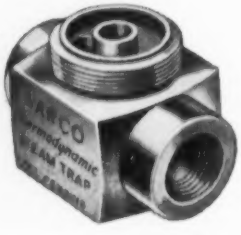
SO RUGGED **SO SIMPLE**

this steam trap practically eliminates maintenance

1. A CAP

2. A DISC

3. A BODY



That's all!

Major advance in trap design!

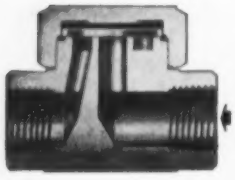
Imagine a steam trap machined from a solid block of stainless steel. A trap with only 3 parts...cap, disc and body...and not even a valve-closing mechanism—the kinetic energy of steam closes the valve and ONLY the TD uses this new operating principle.

That's the revolutionary new Sarco type TD. It has only one moving part... a hardened SOLID stainless steel disc. And it is not affected by superheat, water-hammer, corrosive condensate. That's why we can say INSTALL IT—FORGET IT!

Use the SAME trap for 10-600 psi...for light or heavy loads ...without seat or valve change or other adjustments. Closes tight on no load—no steam waste.

Ask for a 60 day trial installation of Sarco TD trap and strainer... write for bulletin 257. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

2180-B



SIMPLICITY ITSELF!
No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Only moving part a SOLID stainless steel disc.

SARCO

Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.

Thermodynamic Steam Traps

Thermostatic Steam Traps

Float Thermostatic Steam Traps

Liquid Expansion Steam Traps

Camlift Bucket Steam Traps

better than 0.2% and data may be taken from a counter or from the output of a digital computer.

Furthermore, the converter (Electronic Clerk) can be connected to a card-puncher, adding machine, or teleprinting typewriter for remote recordings. Thus, the human element enters the process only to read the final figures.

A modification of the basic checkweigher (Type NC. 632) provides a self-contained electronic unit which, after weighing, channels product into "correct," "overweight," or "underweight" troughs or conveyors. It also automatically counts packages thus checked and may be used with a weight-trend recorder or the converter unit.

Also available for use with the checkweigher is a dough-weigher and rejector (NC. 630). This unit automatically weighs dough pieces (particularly for bread baking), rejecting those that are under- or overweight. —*Solartron Electronic Group, Ltd., Thames Ditton, Surrey, England.*

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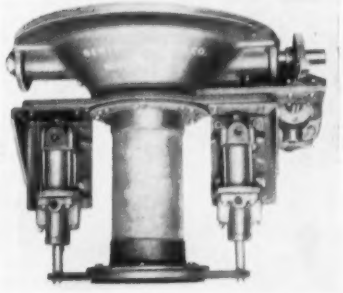


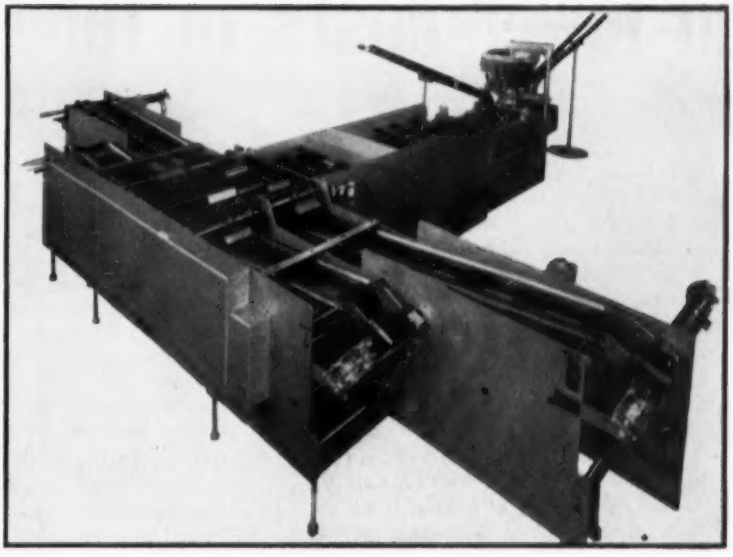
Flexible Sleeve Controls Flow of Dry Powders

This compact unit reportedly solves the problem of transferring dry powders to or from blenders without dusting or spilling.

Known as Retractable Sleeve, it comprises a rubber and metal sleeve that attaches to the blender. Unit expands from 2-4 in. to span the distance between blender and container. When combined with maker's valve (Dust-Tite), sleeve is said to be dust-proof.

A remote regulator permits continuous operator control.—*General Machine Co., 55 Evergreen Pl., Newark, N. J.*

Circle 169A on Reader Service Card



Packager Handles Cookie Sandwiches at 1,400/Min.

Seen automating cookie-sandwich production, this continuous unit takes baked cakes right from the oven at 1,400 per min. and delivers them packaged.

Unit consists of a new packager (Model GTF) connected with maker's double-row sandwich machine (Model GT). In operation, it first forms the sandwiches and divides them into four rows. Then it counts, stacks, groups, and automatically loads them into cellophane bags, cartons, or trays.

In addition, packagers can be coordinated, by conveyors, with maker's cellophane bag-sealing and header-applying machines (Model L-2), or with wrapping machines for cartons or trays.—*Peters Machinery Co., 4700 N. Ravenswood Ave., Chicago.*

Circle 169B on Reader Service Card

New Battery-Driven Truck Has Own Charger Unit

Available as a package unit, this operator-led truck has battery and charger mounted on it, thus offers numerous advantages for large and small plants.

Known as Transporter, unit's charger can be plugged into a lighting circuit (115v., 60 cycle, a.c.) without disconnecting the lead connector, and recharging can be done any time truck is not in use. Eliminating the need for a central charging point effects savings in operator travel time, and in space. Further savings (up to 23%) are reported in initial capital investment for batteries and chargers.

Truck is termed well suited to single-shift operation. If battery is fully discharged, it can be recharged in 10-16 hr. No attendant is needed since charging rate is automatically controlled to curb gassing. And lower battery temperature during charging means less loss of electrolyte which, in turn, minimizes maintenance.—*Automatic Transportation Co., 149 W. 87th St., Chicago.*

Circle 169C on Reader Service Card

How stainless helps control quality and lower costs in food processing

In the soft drink industry, profits are figured in pennies per case and fractions of a cent per bottle. To make a profit, the labor cost, purity and flavor of the drink, come in for constant scrutiny. Stainless steels in the bottling plant have proved the answer to many of the bottler's problems of keeping costs down and quality up.

This 1400 gallon stainless steel syrup storage tank is a good example of where stainless does the best job. It's destined for the new plant of the Pepsi-Cola Bottling Company of Atlanta. It was fabricated by Potter & Rayfield, Inc., Atlanta, Ga.

Considered from a practical, dollars and cents standpoint, stainless steel is the best choice wherever food products touch metal. For example . . .

Stainless can be cleaned completely in record time—a saving in labor costs and an assurance that all contaminants have been completely removed.

Stainless resists the attack of acids and other corroding factors encountered in food processing—a long range saving of equipment and maintenance.

Stainless steel leaves foods strictly alone—it eliminates the chance of metal ion contamination. You save through fewer rejects.

Stainless steel resists abrasion—units last longer, even when subject to constant wear.

There's a lot more to the stainless story. Much of it is contained in Crucible's 40-page booklet "Making the Most of Stainless Steels in the Food Processing Industry." Write for your free copy today. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

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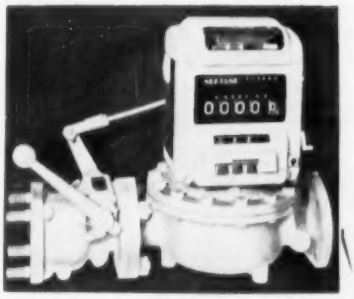

Versatile Liquid Meter 'Remembers' Formula

Equipped with a "memory," this new liquid-batching meter offers greater flexibility in quality control with less operator attention.

Unit is especially recommended for repetitive batching and blending operations. Called Repeating Auto-Stop, it delivers the same quantity each time the valve is opened, and shuts off automatically when a pre-set quantity is reached. Settings are simply changed by pressing buttons on the register.

Typical applications include accurate batching of water, corn syrup, and oils, also production-line filling of barrels or drums. Meters with repeating registers (Series 400) are available in sizes of 1, 1½, 2, and 3 in.

Registers may also be obtained separately for converting maker's existing meters. They come with automatic switch for controlling pumps and agitators, and with ticket-printing unit.—*Neptune Meter Co., 19 W 50th St., New York City.*

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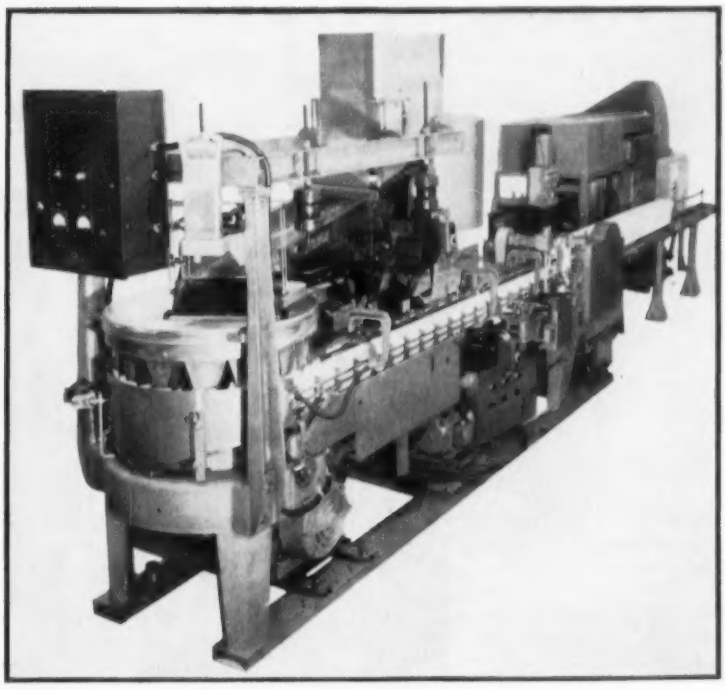

Makes, Fills, and Seals 350 Sift-Proof Cartons/Min.

Special actions of this packaging unit make cartons sift-proof (without a liner), then machine fills and seals them automatically at over 350 per min. Unit packages free-flowing items in cartons ranging 2¾x¾x3⅜ in. to 4x2½x5¼ in.

In making an air-tight carton seal, unit (Model EH Neverstop) first preheats the carton just before applying a hot-melt adhesive for the bottom seal. After filling, carton is top-sealed, then enters a turn-around conveyor section prior to final drying.

At this point, adhesive on side flaps is reactivated and flaps are sealed under pressure. Carton then passes through a refrigeration unit to set the adhesive quickly.

Employed for filling is a new vibratory feeder, electronically controlled for accuracy and speed. As product moves down a vibrator trough, it is automatically checkweighed on a scale pan. Variations in product density or rate of flow, which affect the pre-set weight, are automatically adjusted.—*Stokes & Smith Co., 4992 Summerdale Ave., Philadelphia.*

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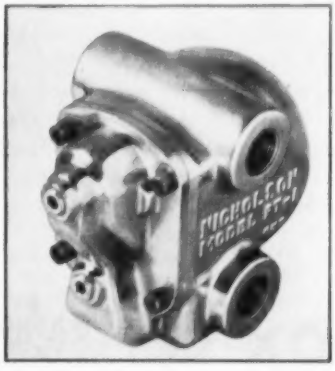


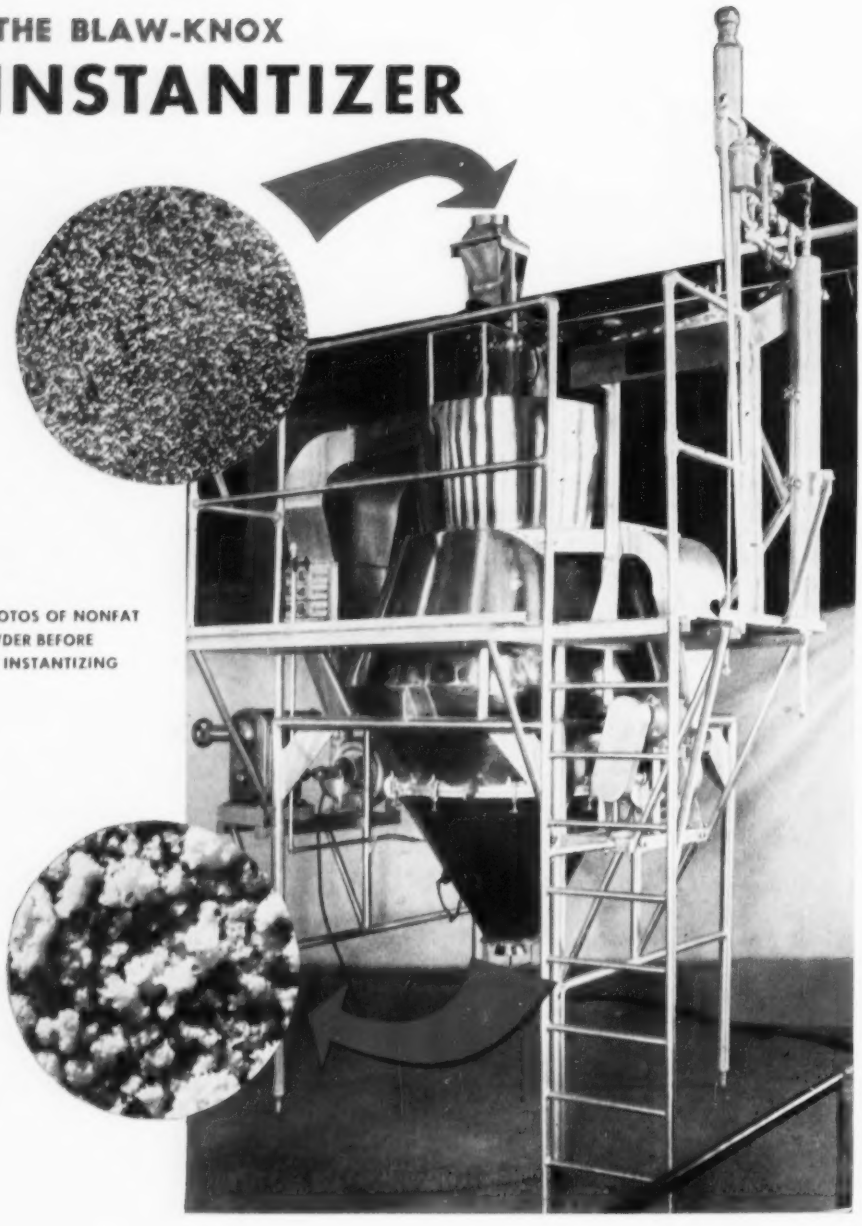
Line Pressure Actuates New Steam Traps

Actuated by line pressure rather than by float buoyancy, this new float-thermostatic steam trap offers a wide range of applications where high discharge capacity at pressures to 25 psig is required. Lightweight units are available for ¾ and 1-in. lines.

Called Model FT-1, they employ valves and seats of stainless steel, which need not be changed for any

THE BLAW-KNOX

INSTANTIZER



ACTUAL PHOTOS OF NONFAT SPRAY POWDER BEFORE AND AFTER INSTANTIZING

Instant powder is produced simply and economically with the Blaw-Knox Instantizer. Critical powder drying operations are not necessary to produce an "Instant" product. Powder is fed to the unit and quickly instantized. No high temperature after drying is necessary. Production of nonfat milk powder flows at the rate of 750 pounds per hour ready for the package. Quality of the powder does not change. The Blaw-Knox Instantizer is effective on nonfat and whole milk, chocolate blends, and many other products. It can be independent from the spray drying area and requires only a small amount of floor space. Ask us for details about the performance of our units now operating in the field. - - - Our new brochure is available for the asking.

BLAW-KNOX CO. DAIRY EQUIPMENT DIVISION
MORA, MINNESOTA

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pressure within the traps range. Separate discharge is provided for condensate and air. Furthermore, all internal mechanisms are attached to an easily removed cover plate to facilitate inspection and servicing.

With dual inlets and outlets, these traps readily fit into existing piping layout.—*W. H. Nicholson & Co., Wilkes-Barre, Pa.*

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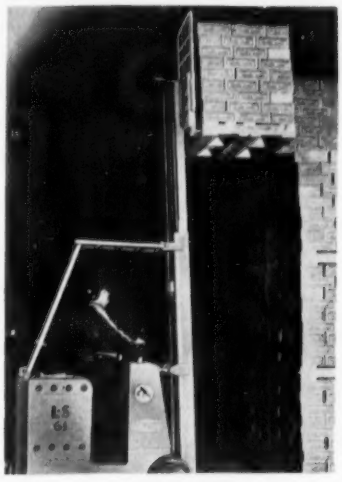

Electric Truck Equipped For Freezer Operation

Special optional equipment, available on a new line of electric-powered fork trucks, offers efficient operation in sub-freezing areas. Truck capacities range 1,000-4,000 lb., fork elevations 100-147 in.

Known as Model "E," units may be protected from corrosion with any of the following: Brake enclosure, chrome-plated brake cams, special hydraulic oil and lubricants for drive-axle housing and steering box, sealed bearings with water-resistant lubricants, and undercoating.

Other options include a heated control panel, side and rear bumper strips, and stainless steering chain.

Trucks are operated from a standing position, since operators frequently must mount and dismount while wearing heavy clothing. Traction speeds are 5-6 mph. Turning radius is 61 or 66½ in., depending on truck capacity and/or load length. —*Lewis-Shepard Products, Inc., 125 Walnut St., Watertown, Mass.*

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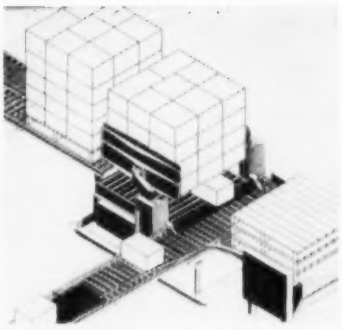

Automatic Pallet Unloader Handles 30 Cases/Min.

Actuated by electric motors and hydraulic devices, a new pallet unloader automatically discharges individual cases to a conveyor at 25-30 per min. Unit handles pallets from 24x24 in. to 48x48 in.

Called De-Palletizer, it employs panel-mounted controls to regulate the following operating sequence:

Full pallets, deposited at loading station (usually by lift truck), are advanced to a dispersing table where a clamp holds all but the bottom tier. This permits bottom cases to move to discharge conveyor in single file until all cases have been unloaded. Empty pallets are automatically stacked into a magazine.

Cases that are released crosswise of the discharge conveyor are turned lengthwise when contacted by a side projection.—*Alvey Conveyor Mfg. Co., 9313 Olive Street Rd., St. Louis.*

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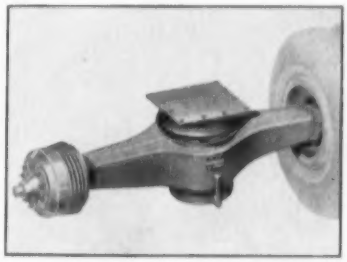

New Trailer '5th-Wheel' Offers Many Advantages

Here is an important development in 5th-wheel engineering—a lightweight front-suspension assembly built inside the axle housing. It's designed for increased payloads, reduced maintenance, and greater safety for tractor-trailer combinations.

Specifically designed for the rear trailer of a truck train, this integral-

Capacity Up 16% Without Increasing Overall Length

Engineered for maximum efficiency and driver safety in city or suburban frozen-food delivery, this new truck offers 16% more body capacity with no increase in overall length. Refrigerated unit (Model 3022) has a 22-ft. body, 181½-in. wheel base, tandem axle, and employs 10.00x20 tires.—*White Motor Co., E. 79th St. & Wallace Ave., Cleveland.*

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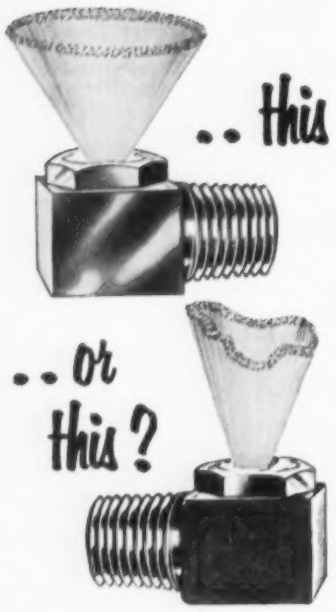

BE SURE OF A PERFECT CONICAL SHAPE SPRAY ALL THE TIME WITH *Monarch*

For a perfect spray. Many food processing plants prefer Monarch nozzles.

This advanced design nozzle reduces clogging and guarantees dependable food processing applications to

- WAX FRUITS
- RINSE VEGETABLES
- POWDER MILK
- DRY EGGS
- WASH FILTER CAKE
- HUMIDIFY BANANA ROOMS

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MFG. WORKS, INC.
2517 E. ONTARIO ST.
PHILADELPHIA 34, PA.

axle assembly eliminates the need for leaf springs. Instead, it employs a cushioning system of rubber "doughnuts" floating in a sealed oil bath. Result is a unit that weighs only about 550 lb.

Furthermore, this design provides maximum driver control with full load of liquids or solids, also with an empty trailer. It neutralizes rebounds, reduces trailer shift, and minimizes product-damaging vibrations.

Structurally, the equipment consists of a stabilizer unit fastened to the trailer frame, and the axle assembly. Latter, consisting of shock-absorbing cushion rings, is housed inside the front axle, which acts in a dual capacity.

Inside, five pairs of synthetic rubber rings, bonded to steel divider plates, carry the vertical load. In addition, Neoprene O-rings absorb all rebound shock. This assembly is cased with a protective cover and enveloped by a permanently bonded synthetic rubber cushion-jacket.

A center pin links the two assemblies, thus providing a turning axis.—*A. O. Smith Corp., 5715 Smithway, Los Angeles.*

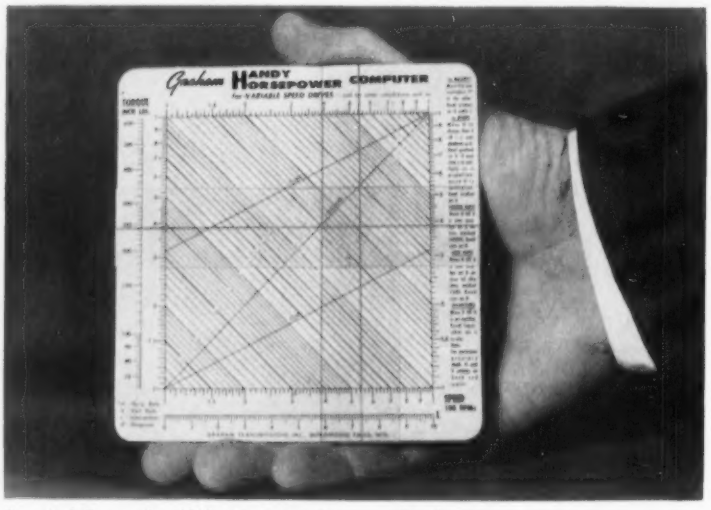
Circle 173D on Reader Service Card

New Truck-Cooling Unit Ups Operating Efficiency

Numerous advantages are cited for a new continuous-refrigeration system for retail milk-delivery trucks.

Known as Lance, it offers: Maximum cooling while occupying a minimum of space; greater payloads; rapid recovery after door openings; safe, overnight milk storage permitting pre-loading at any hour; no battery drain; and quiet, 24-hr. operation.

These advantages are attributed to mechanical simplicity and compact-



Special-Formula Slide Rule Is Free to Engineers

This versatile calculator handles not only ordinary slide-rule computations, but rapidly solves special formulas involving two variables (raised to any power or root) and a constant. Typical examples are formulas for tank capacity and motor horsepower. A complimentary copy of the slide rule and a booklet that briefly explains its principle are offered to engineers who write in on their business letterhead, making reference to this item.—*Graham Transmissions Inc., Menomonee Falls, Wis.*

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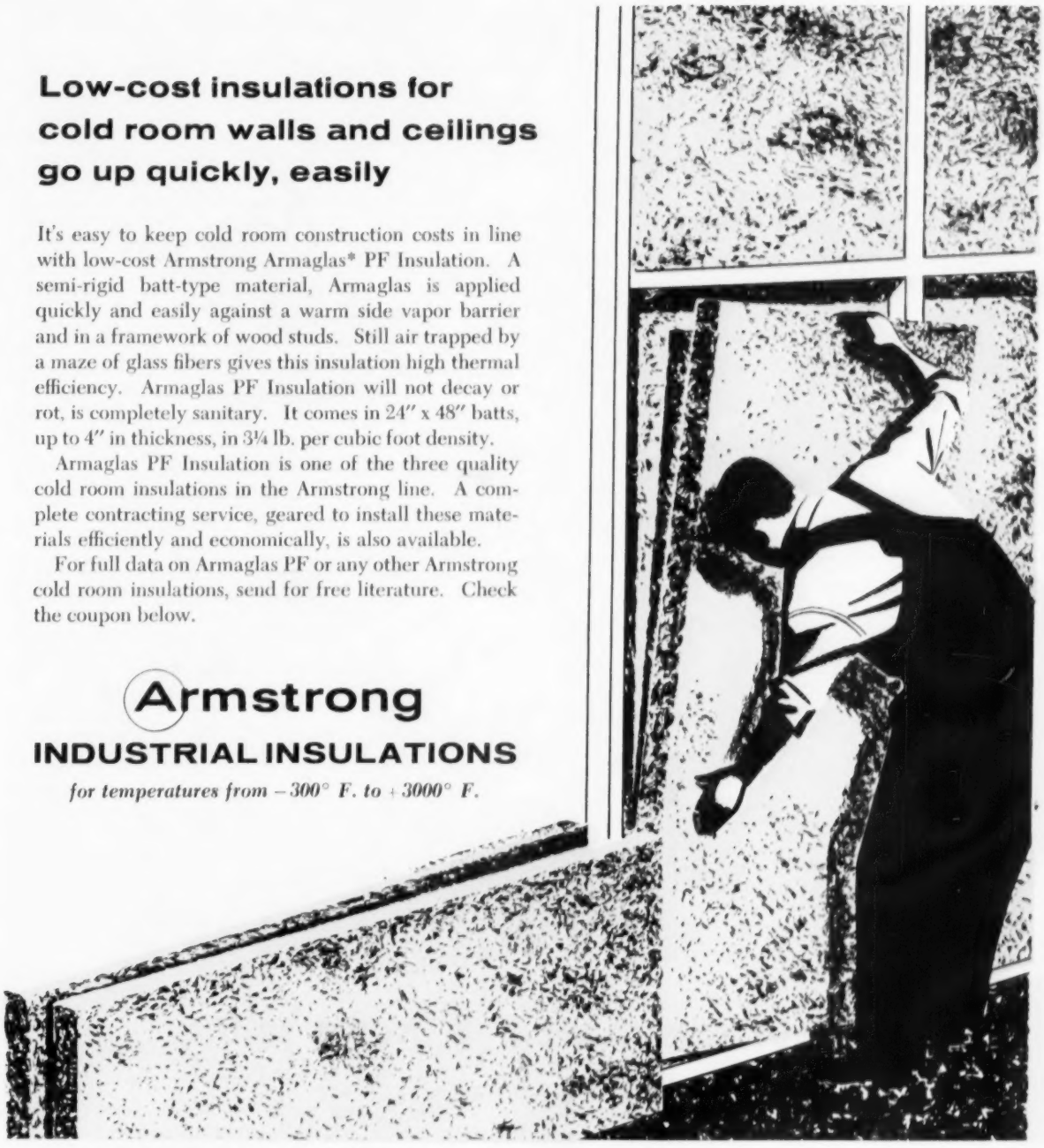
Low-cost insulations for cold room walls and ceilings go up quickly, easily

It's easy to keep cold room construction costs in line with low-cost Armstrong Armaglas* PF Insulation. A semi-rigid batt-type material, Armaglas is applied quickly and easily against a warm side vapor barrier and in a framework of wood studs. Still air trapped by a maze of glass fibers gives this insulation high thermal efficiency. Armaglas PF Insulation will not decay or rot, is completely sanitary. It comes in 24″ x 48″ batts, up to 4″ in thickness, in 3¼ lb. per cubic foot density.

Armaglas PF Insulation is one of the three quality cold room insulations in the Armstrong line. A complete contracting service, geared to install these materials efficiently and economically, is also available.

For full data on Armaglas PF or any other Armstrong cold room insulations, send for free literature. Check the coupon below.



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☐ Armstrong Armalite** Insulation for Low-Temperature Rooms

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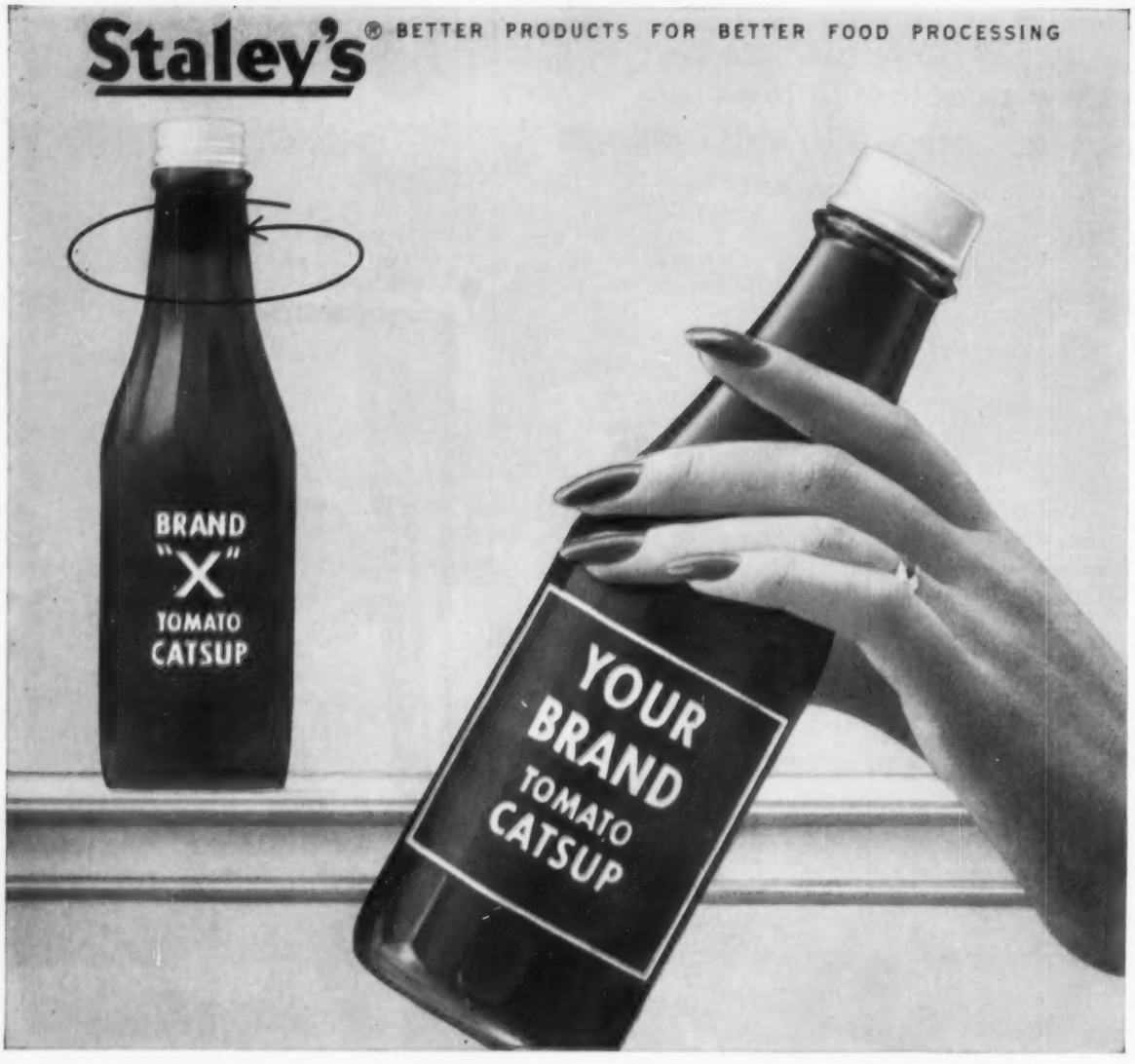
Staley's® BETTER PRODUCTS FOR BETTER FOOD PROCESSING



Don't let your catsup wear a brown collar

Sweetose Syrup prevents unappetizing oxidation in the upper 1" of bottle—holds rich red color—perks up flavor! To stabilize rich appetizing color of catsup—especially in the troublesome neck of the bottle! To produce the kind of taste that keeps customers buying again and again! And to accomplish both objectives without masking the delicate spicy flavor that keeps a brand in demand!

Sounds like a big order . . . *and is*! But the extensive use of Sweetose, Staley's enzyme-converted corn syrup among leading processors proves these points where they count. First, at the checkout counters where it's make or break in today's competitive food picture. Second, in the homes, hotels and restaurants across the land.

You'll find that up to ⅓ of the total sweetener in your catsup may advantageously consist of Sweetose. In fact, expert taste panels have consistently preferred these blends over catsup made with all sucrose.

Other advantages include flexibility and accuracy in handling—improved sanitation—and up to a whopping 96.2% savings when the Staley's simple 3-step system of sweetener handling is used. Interested? Call your Staley's Representative at the branch office nearest you or write today to . . .

A. E. Staley Mfg. Co., Decatur, Illinois
Branch Offices: Atlanta • Boston • Chicago • Cleveland • Kansas City
New York • Philadelphia • San Francisco • St. Louis

Sweetose®
CORN SYRUP

ness of the refrigeration equipment, which weighs only 305 lb. It consists of a drive unit, condenser assembly, and blower-evaporator. Only the latter unit is in the storage compartment, the other two being located at or near the chassis level. This maintains a low center of gravity and permits installation with no change in body design.

The power train consists of an engine-crankcase pulley, flexible drive shaft, and an electric clutch. Power from truck's engine drives the compressor in over-the-road operation, and a manual switch permits shut-off of the entire unit. Standby power is provided by a ¾-hp. motor (110-120 v., single phase).

Condensing unit is installed in the driver compartment and is connected to the blower-evaporator through copper tubing. It provides efficient dissipation of heat and is easily installed. Overall dimensions: 13¼x 28½x25 in.

Blower is mounted at the top forward end of the body. It measures 5⅜x59⅜x9¼ in. Use of an integrally mounted fan throws cold air over the load for maximum effect.—*Tranter Mfg. Co., Kold-Hold Div., Lansing, Mich.*

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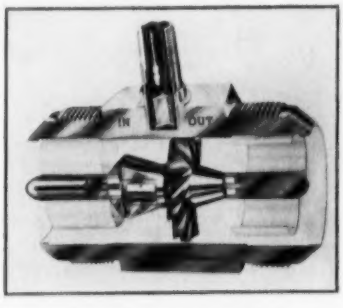


Precision Flow Meter Has Sanitary Design

High accuracy, simplicity, and versatility are advantages cited for a new line of sanitary flow meters.

Known as Pottermeters, they are available in stainless steel, offer capacities to 12,000 gpm, and are accurate to 0.1%. Units are easily installed without extra piping, operate in any position, and require only four diameters of straight-run pipe on the upstream side. Used with various indicating and recording devices, they show total quantity of flow as well as flow rate. They can also be used in an automatic batching-control system.

Trend to Bulk Handling of Sugar Continues to Rise

20 to 30% of INDUSTRIAL SUGAR NOW HANDLED in BULK. 80% POTENTIAL is FORECAST*

Many industrial sugar users are converting from bag to bulk to reduce rising sugar handling costs.

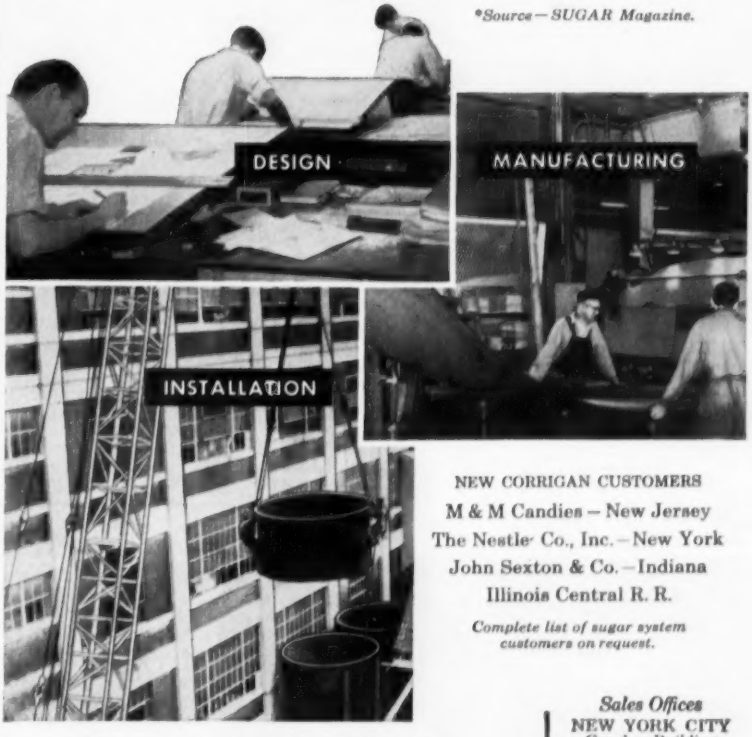
To solve this problem, profit-minded managements are consulting J. C. Corrigan Co., pioneers in the design, manufacture and installation of automatic bulk sugar handling systems. Corrigan systems are now at work in

14 Refineries in United States and other countries.
55 Food processing plants in 15 Industries.
90 Insulated hopper type railroad cars.
2 Sugar hopper cars with push button built-in conveyor.

If *your* company has a sugar handling problem we invite your inquiry. There is no obligation. We will give you facts, figures and a FREE plant survey. Equipment financing plan also available.

J. C. CORRIGAN CO. OFFERS COMPLETE SUGAR HANDLING SERVICE.

**Source—SUGAR Magazine.*



NEW CORRIGAN CUSTOMERS
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The Nestle Co., Inc.—New York
John Sexton & Co.—Indiana
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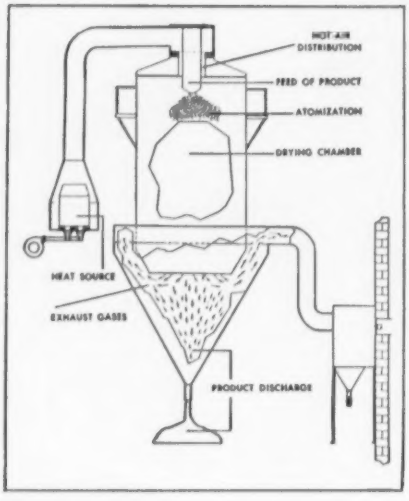
PERFORMANCE IN FOOD PROCESSING —GUARANTEED BY PROCTOR

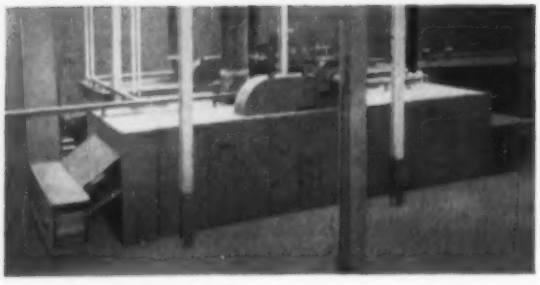
From −55°F. to 240°F. For Liquids, for Solids.

Every Proctor product for the Food and Process Industries carries the famous Proctor performance guarantee, based on wide experience and a careful analysis of product requirements. Proctor's new Continuous Plate Freezer too, is guaranteed for the same high production rates and top product quality—it too features the same reliability, the same operating economies, the same product uniformity found in all Proctor products.

This Proctor Continuous Plate Freezer operates down to −55° F.! This means quicker freezing, more production of regularly shaped packages.



Proctor Spray Dryers are designed and built to suit the requirements of your product—from pilot plant scale to large production units.



Proctor Drying Ranges are built to achieve uniform drying—the key to product quality.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA 20, PA.

Proctor

Equipment & Supplies

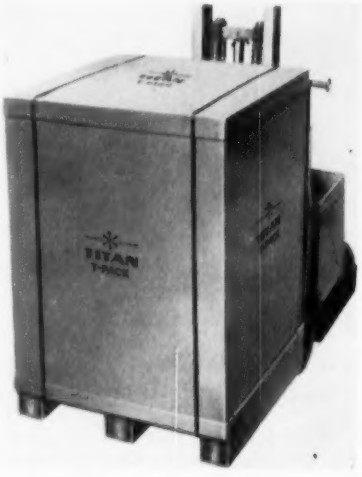
In operation, meter employs hydraulic pressure of the measured fluid to "float" its turbine-type rotor. Thus, friction is eliminated and rotor spins freely at a rate directly proportional to velocity of flow.

Mounted within the rotor is a small permanent magnet that generates an alternating current as rotor spins. To measure the flow, electrical output of the sensing element is applied to an electronic frequency converter, which produces a d.c. signal proportional to frequency.

Units operate at temperatures from −455F. to +1,200F., and measurement accuracy is not affected by variations in fluid pressure or density. Viscous liquids increase down-stream drag on the rotor, which shortens the range of linear operation. However, this effect is not appreciable at viscosities below 5 cps., and it decreases as size of sensing element increases.

Fluids containing suspended particles may also be measured provided the particles are small enough to pass freely between the rotor blades. —*Potter Aeronautical Corp., Union, N. J.*

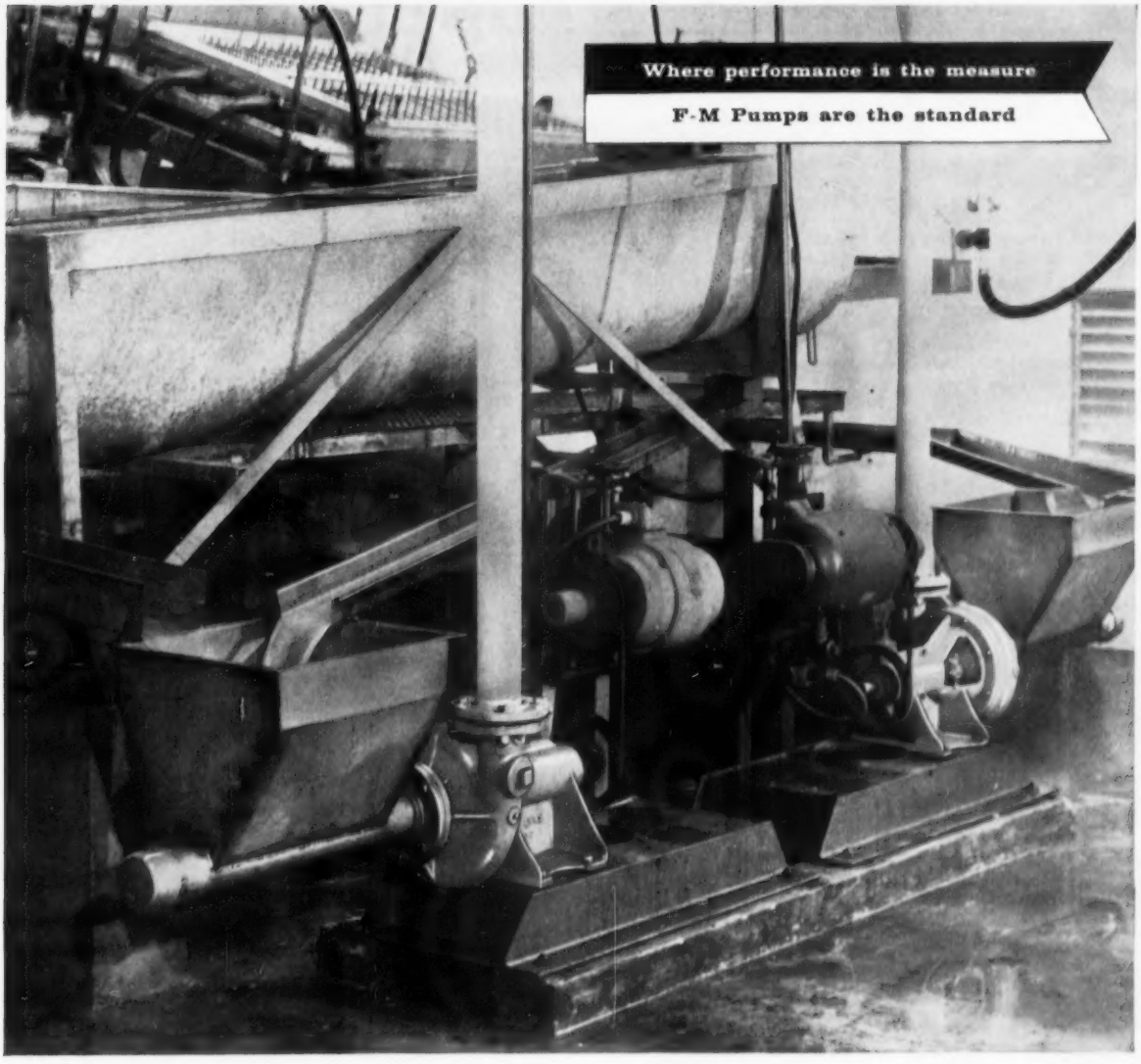
Circle 177A on Reader Service Card



Self-Palletized Container Cuts Shipping Costs

Handling economy, product protection, and expendability are advantages cited for a new self-palletized container for bulk solids.

Called T-Pack, unit is internally supported and has a lid that can be strapped or taped. Container is designed for loads up to 1 ton (depending on product density), and stows



...they never give a shrimp a break

Fragile shrimp are moving through these Fairbanks-Morse bladeless-impeller pumps—moving smoothly, gently and economically for a leading food packer.

Because of their exclusive bladeless design, these F-M pumps literally flow solids in a liquid cushion, without clogging and without damaging the product.

This low-cost method of conveying solids via hydraulics is increasing throughout industry. Whatever type solids you are conveying now, chances are an F-M non-clog bladeless-impeller pump can move it safer and cheaper. Why not find out for sure? Call your Fairbanks-Morse Field Engineer—he'll be glad to work with your own engineers in specifying the exact F-M pump you need. For information, write Fairbanks, Morse & Co., Dept. FE-5, 600 So. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

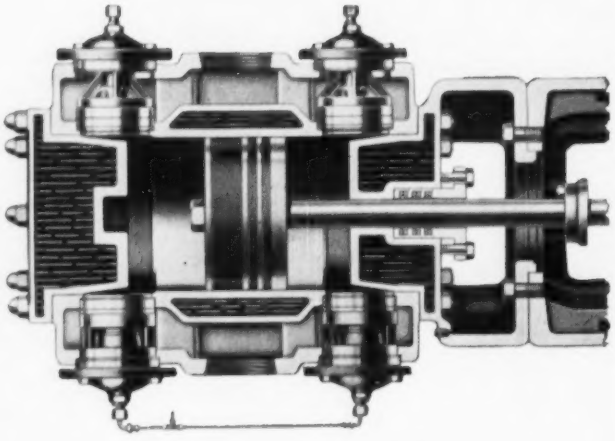
For more data, circle this page number on card at back →

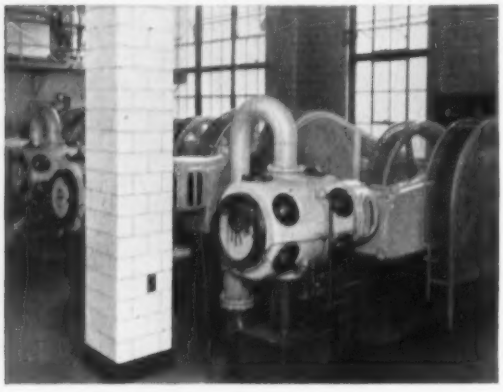
A dependable supply of

oil-free air or gas

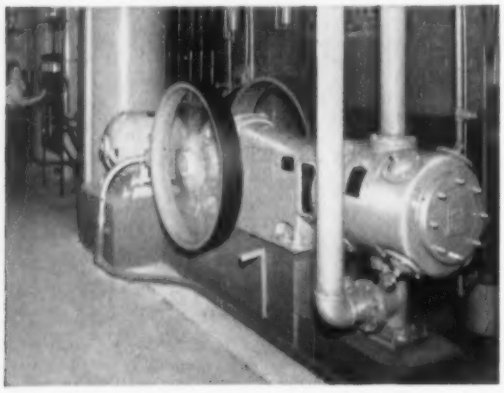
Graphitic-carbon wearing rings and pressure rings prevent metallic contact between the piston and cylinder bore—no oil is used anywhere in the compression cylinder or on the piston rod.

NL Channel Valves are designed specifically for non-lubricated service. Carbon guides protect channel ends and special Teflon strips protect channel interiors and spring ends from metal-to-metal rubbing and wear.





Installed in a large brewery in 1933, this Ingersoll-Rand ES-NL compressor was the first unit ever built with non-lubricated cylinders. It is still in daily service, providing the clean, oil-free compressed air which is vital to product purity. Three other ES-NL compressors, installed since then, are shown in the background.



One of four ES compressors with NL cylinders, supplying oil-free air in the manufacture of super-precision instruments and aircraft ball bearings.

with Ingersoll-Rand

ES-NL

compressors

In process and manufacturing plants all over the world, the problem of oil contamination in compressed air and gases has been successfully solved by the application of Ingersoll-Rand ES-NL compressors.

The unique NL cylinder design provides compression without oil lubrication—through the use of graphitic-carbon wearing and pressure rings. The ability of these compressors to deliver clean, oil-free air and gas, in continuous, heavy-duty service, has been thoroughly proved in every field of application.

If you have an application where oil-lubricated compressor cylinders cannot be used, ask your Ingersoll-Rand representative about the ES-NL compressor, sizes 5 to 150 horsepower—other Ingersoll-Rand NL compressors to 1000 hp.

Ingersoll-Rand

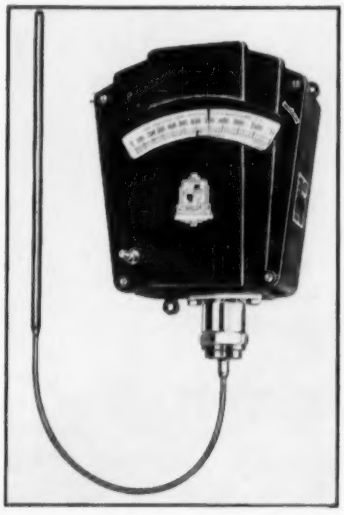
1-422 11 Broadway, New York 4, N. Y.

COMPRESSORS • CONDENSERS • AIR & ELECTRIC TOOLS • PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES

compactly in rolls 3 wide and 2 high in standard box cars, 2 wide and 2 high in standard trailers. Strong and lightweight, unit assists in meeting minimum-freight-rate requirements, also adds additional "live" product.

Standard dimensions are 35x35x48 in., which can be varied for particular requirements. Containers are delivered knocked down to minimize shipping and storage costs, and are purchased only as needed.—*Titan Pallet Co., 527 Madison Ave., New York City.*

Circle 178A on Reader Service Card



High-Temp Limit Control Prevents Heat Damage

A fast-acting, high-temperature limit control, this unit cuts off heat supply if a predetermined temperature, set on an accurately calibrated scale, is exceeded.

Thus, controller (Model HL 15-10) protects equipment or product against loss or damage. Scale and element ranges are 0-900 F. and 0-1100 F. Temperature is continuously indicated by a black pointer on the scale, which provides a check on the process and gives visual proof that control is operating.

Unit's snap-acting switch, which breaks the control circuit when temperature exceeds a pre-set figure, is of the manual-reset type. A second switch, in series with the first, is normally closed. It opens only if temperature drops below 60 F., but this point may easily be adjusted. Second switch provides a fail-safe feature, as any loss of fill in thermal element will cause a drop in indicated temperature.

Selected high-temperature limit is easily set by turning a slotted shaft with a screwdriver. Cover is provided with capstan screws. Wire may be threaded through holes in screws and secured by a lead seal as protection against tampering.—*The Partlow Corp., New Hartford, N. Y.*

Circle 181A on Reader Service Card

INGREDIENTS

Bromelin Now Available As Commercial Enzyme

Bromelin, a highly potent protein-digesting enzyme extracted from the pineapple plant, is now commercially available.

Typical applications include use in meat tenderizers, chill proofing compounds for beer, protein hydrolysates, and baked goods.—*Takamine Laboratory, Clifton, N. J.*

Circle 181B on Reader Service Card

High-Purity Topping Salt Meets Bakers' Needs

This chunky salt (99.95% pure) offers excellent flavoring and dissolving qualities, plus ability to withstand rigorous handling and baking temperatures.

Product is specifically designed as a topping for pretzels, breads, hard rolls, and bread sticks. Finer screenings of the salt are used for crackers.

For pretzels, it is available in two sizes (Pretzel M, coarser grain; and Pretzel F, smaller grain) yielding a topping that is not too hard, bitter, or abrasive.—*Diamond Crystal Salt Co., St. Clair, Mich.*

Circle 181C on Reader Service Card

CHEMICALS

Efficient Metal Cleaner Removes Scale, Rust

A powdered acid material, this new cleaning compound is termed highly effective in removing scale-like deposits and rust—with safety both to personnel and metal surfaces.

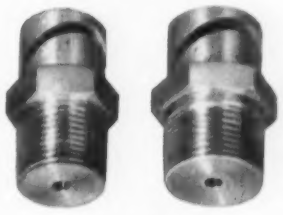
Known as Drycid, it quickly dissolves in water and is used, in con-

GET MORE OUT OF YOUR SPRAYING EQUIPMENT WITH LESS POWER

For spraying, washing, rinsing and cooling, Yarway Spray Nozzles will improve the efficiency of your spray equipment.

There are no internal vanes or other restrictions to clog or hinder the flow.

Cast bronze Involute-type
(Bar stock also available)



Bar stock Fan-spray type

Yarway Spray Nozzles are available in two types—the Yarway Involute producing fine hollow cone spray with minimum energy loss, and the Yarway Fan-spray for flat fan-shaped spray with time-saving slicing action for cleaning.

Ask for a free copy—Bulletin N-618.

YARNALL-WARING COMPANY
127 Mermaid Avenue
Philadelphia 18, Pa.

YARWAY spray nozzles

HAMILTON
STAINLESS STEEL KETTLES

JUST think! Over three quarters of a century building fine cooking and mixing kettles for industry. These quality units, engineered and designed by the finest craftsmen, insure higher efficiency, labor-saving and cost-saving operation. There's no substitute for the best—"Hamilton." When it comes to mixing, the agitators, the drives are designed for longer life and these rugged sanitary units have proved themselves in operation. The Steam. Jacketed Kettles are fast-cooking, easy-cleaning, precision-built.

If it's the best you want—then you want "Hamilton," the foremost designers and producers of the finest kettles to mix and cook. There's a "Hamilton" to suit your specifications so why settle for anything but the best, a "Hamilton" Stainless Steel Kettle.

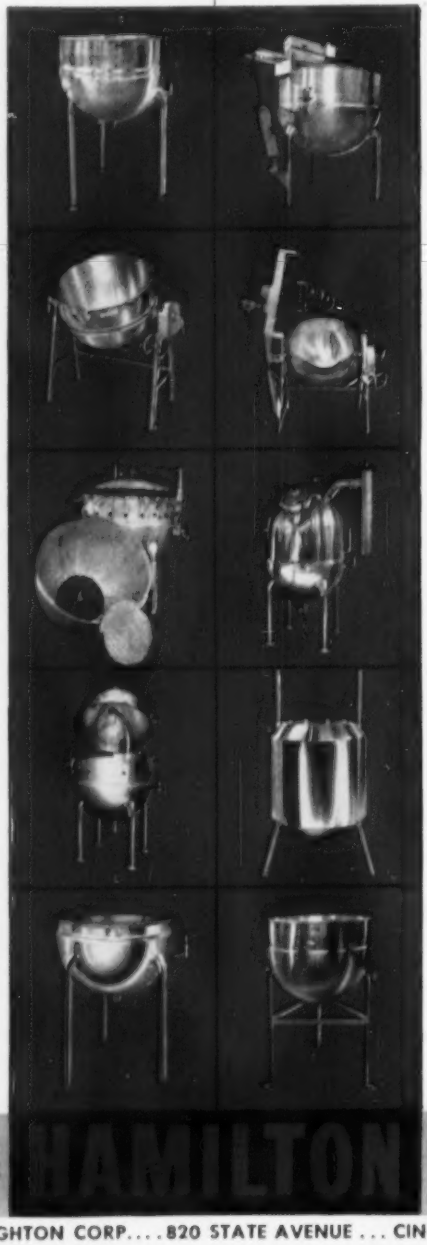
STYLE SA
Streamlined design, balloon jacket. Extra large diameter provides greater heating surface, efficient cooking. Sizes range from 15 to 500 gallon. A.S.M.E. Code constructed for steam working pressures of 40, 90 and 125 pounds.

STYLE CW
Designed to process large batches up to 150 gallons. Positive worm gear and handwheel give complete control of large capacity loads while tilting. Large diameter kettle gives fast, even cooking. Sizes from 30 to 150 gallons.

STYLE PC
Stainless steel pressure cooking kettle, designed especially for meat and poultry processing. Balloon jacket gives increased heating capacity. Built for 90 p.s.i. in jacket and 15 p.s.i. in kettle. Has quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

STYLE VT
For small batches this unit has no equal. Vacuum cooker with tilting top, easy loading. Sizes from 30 to 150 gallons. Sanitary design throughout. Jacketed for 90 p.s.i. steam working pressure.

STYLE SB
Shallow type kettle with balloon jacket. Streamlined for complete sanitation. A.S.M.E. Code constructed for working pressures of 40, 90, and 125 pounds. Sizes range from 15 to 350 gallons. Larger size kettle can be furnished to meet specifications.



STYLE SA MIX COOKER
Standard SA Mix Cooker has either single motion or double motion agitator with or without hydraulic lift. With hydraulic lift agitator lifts easily and smoothly out of cooker. Sizes range from 30 to 500 gallons.

STYLE CW MIX COOKER
Large diameter gives fast even cooking. Hydraulic Lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.

STYLE HV
A vacuum cooker for large capacities from 150 to 500 gallons. A hinged manhole is provided for access to the inside. Available with a mixer — circulator can be installed to increase heat transfer and agitation.

CIRCULATOR
Stainless steel steam immersion heating unit can be installed in any kettle regardless of size or shape. Gives extra heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.

STYLE A
General purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ½ jacketed. Sizes range from 15 to 500 gallons. Also available in Type 316 stainless steel or nickel. Larger sizes to meet specifications.

KETTLE SPECIALISTS

HAMILTON

SINCE 1876

DIVISION OF BRIGHTON CORP. . . . 820 STATE AVENUE . . . CINCINNATI 4, OHIO

centrations up to 8 oz. per gal., by circulation or immersion. Solutions may be applied cold or heated to 165F. for faster cleaning action. Material is shipped in fiber drums and has a mild aromatic odor.—*Oakite Products, Inc., 19 Rector St., New York City.*

Circle 181D on Reader Service Card

Iodine Sanitizer Available In Handy Tablet Form

A potent sanitizing solution may be prepared simply by dropping one of these effervescent tablets of diatomic iodine into 2½ gal. of water. Latter may be either hard or soft.

Called Heliogen R, tablets quickly dissolve to produce a non-toxic solution that is also non-corrosive and non-irritating to the skin. In use, it leaves no odor, taste, or film.

For maximum stability, tablets are individually packaged in aluminum foil, 50 per box.—*S. B. Penick & Co., 50 Church St., New York City.*

Circle 182A on Reader Service Card

BRIEFS . . .

Stainless Conveyor Chain is specially designed for easy disassembly. Pin-type unit is used in single or multiple strands, and each link has a wing attachment that accommodates wood or metal conveyor slats. —*Robert A. Main & Sons, 257 Pascack Rd., Paramus, N. J.* (182B)

Heavy-Duty Aluminum Grating employs rectangular-riveted construction for high strength, rigidity, and ease of cleaning. Unit (RR) has 79% clear opening, which curbs accumulation of dirt.—*Klemp Metal Grating Corp., 6601 S. Melvina, Chicago.* (182C)

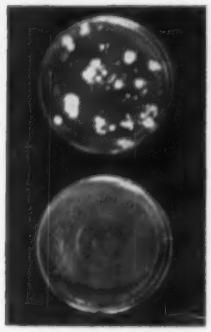
New Spray Nozzles, designed for concentration of pattern area, offer capacities of 1.5 to 1,100 gpm. Units (Hollowjets) are available in pipe-connection sizes from ¼-5 in., in stainless, brass, and steel.—*Spraying Systems Co., 3212 Randolph St., Bellwood, Ill.* (182D)

Tank-Selector System automatically controls filling of storage tanks. System (ATS) employs a pneumatic circuit with selector-controllers and level transmitters. It senses liquid

In frozen foods, too — the High note of Quality is Griffith's!

You wash 'em
— peel 'em
— skin 'em
— trim 'em
ALL to keep 'em tasty - fresh from field and stream, and bush and tree : . .
— heat 'em
— freeze 'em
— constantly check 'em

But how well-controlled is the quality of ingredients you use?



TAKE GROUND SPICES AND SEASONINGS . . .

Griffith's are Purified! Prime quality — protected by patented Sterilization Processes to rid them, for all practical purposes, of micro-organisms that may cause off-flavor or costly spoilage. *TRUE FLAVOR CONTROL!*

TAKE MEAT TENDERIZERS . . .

Griffith's Tenderizers are formulated to improve the flavor while tenderizing tough, low cost beef. Are laboratory controlled for uniform potency and stability of the active principle. *QUALITY CONTROLLED!*

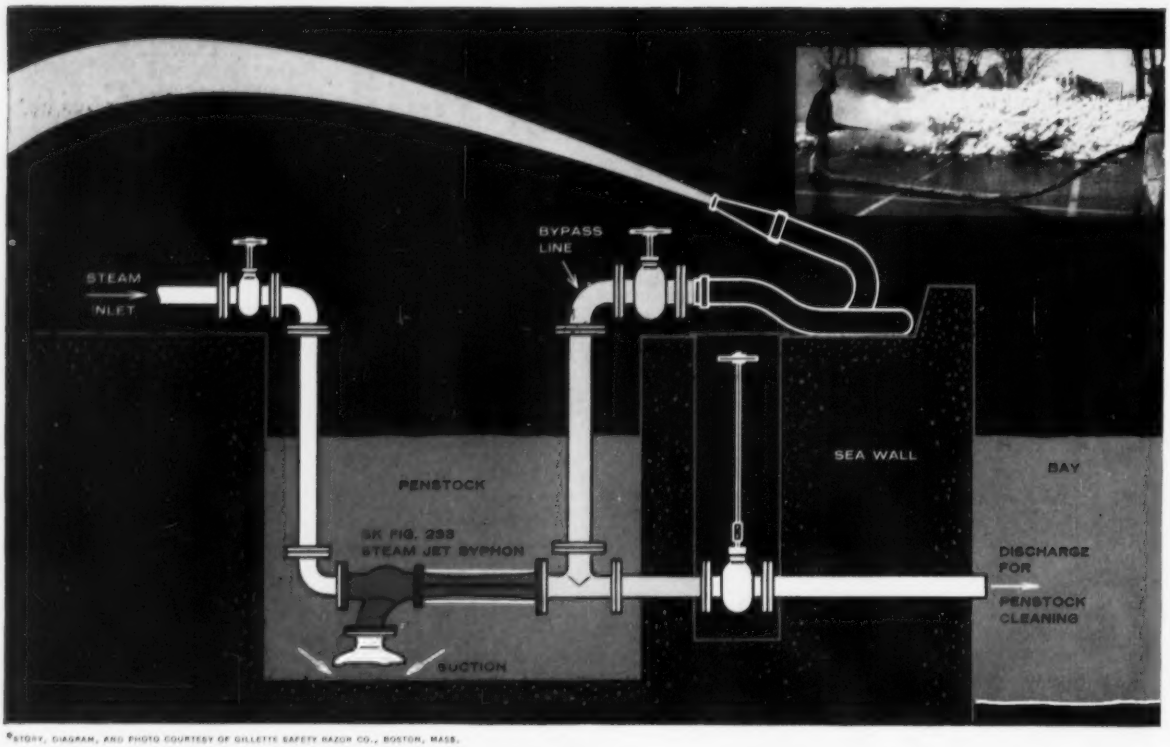
TAKE PEPPEROYAL (R) AND SOLUBLIZED SEASONINGS

PEPPEROYOL is just one of many spices processed from Griffith's own spice extractives. Controls assure Griffith's higher standard of flavor potency and purity—always uniform, always predictable in excellence of quality. Packed airtight in batch-size bags.

Your quality control can be made easier by Griffith.

THE GRIFFITH LABORATORIES, INC. NEWARK

CHICAGO 9, 1415 West 37th Street LOS ANGELES



*STORY, DIAGRAM, AND PHOTO COURTESY OF GILLETTE SAFETY RAZOR CO., BOSTON, MASS.

THIS SK STEAM JET SYPHON
performs dual function at great saving

SK Steam Jet Syphon provides hot water for melting, removing snow. Syphons in large sizes, 4 in. (250 gpm) to 10 in. (3000 gpm) are widely used for emergency drainage. Small sizes, ½ in. (6 gpm) to 6 in. (600 gpm) are used for intermittent-but-frequent service.

Before installing the SK Steam Jet Syphon illustrated above, the manufacturer who devised this system* used contractors to clean accumulated silt from a plant-area penstock and used heavy, expensive machinery to clear snow from company parking lots.

Seeking a means to do both jobs themselves at less cost, company power engineers investigated, then installed, the SK 5 in. Steam Jet Syphon shown above. To clean the penstock, the bypass line valve is closed and the discharge-to-bay and steam valves are opened. Pressure steam, issuing from the syphon nozzle, entrains water and silt from the penstock and discharges, against a head, into the bay.

For clearing snow, as much as 500 ft. of 3 in. fire hose is attached to the bypass line. The bay line valve is closed and the bypass and steam valves are opened. The pressure steam entrains water from the penstock and discharges through the hose. The hot water from the hose, at 500 gpm, is used to melt and wash the snow into catch basins, see photo.

The syphon cost about $500.00. It now costs about $120.00 to clean the penstock (a substantial saving) and the cost of removing snow is about one-tenth of the previous cost.

Imaginatively applied, SK Jet Apparatus can do many jobs well at low cost. Learn more about Jet Apparatus by writing for Bulletin J-1 which describes SK's complete line and many applications.

JET APPARATUS: Ask for Condensed Bulletin J-1.
ROTAMETERS & FLOW INDICATORS: Ask for Condensed Bulletin 16-RA.
VALVES: Ask for Condensed Bulletin V-1.
HEAT TRANSFER APPARATUS: Ask for Condensed Bulletin HT-1.
GEAR PUMPS: Ask for Bulletin 17-A.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS SINCE 1876
2223 State Road, Cornwells Heights, Bucks County, Pa.

level in any of 12 tanks per circuit to open fill valves if filling is necessary. Scanning may be continuous or intermittent, and requires 1 sec. per tank.—*Mason-Neilan, Norwood, Mass.* (182E)

Self-Supporting Batting, made of crimped nylon fibers, offers numerous applications in thermal insulation, packaging, liquid and gas filtration, and vibration absorption. Product (Ny-Sul-Loft) is available in weights ranging 2-8 oz. per sq. yd., and in any width to 55 in.—*Star Woolen Co., Cohoes, N. Y.* (185A)

High-Speed Cheese Cutter cuts rectangular blocks and wheels into chunks, ready for wrapping. Air-operated machine has two cutting heads (horizontal and vertical) that maintain required product dimensions. Unit occupies 25½x62 in., table height is 35 in.—*R. Howard Strasbaugh Engineering Co., 10990 Santa Fe Ave., Lynwood, Calif.* (185B)

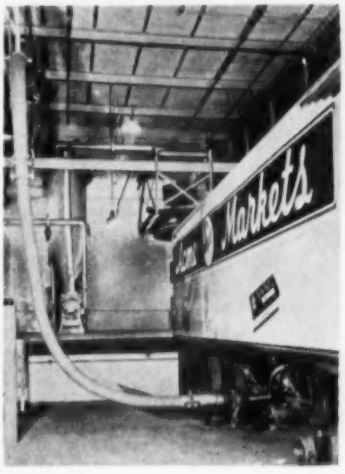
Vacuum Brining Tanks for apple slices have simplified design enabling easier sanitation. Units of Types 304 or 316 stainless steels are available in 325- and 525-gal. sizes.—*Lee Metal Products Co., Philipsburg, Pa.* (185C)

Efficient Dairy-Plant Washer eliminates hand scrubbing of demountable equipment through use of turbulent circulating solution that provides rapid cleaning. Unit (Circulating Parts and Fittings Washer) has two stainless wire baskets for small parts, and automatic temperature control is optionally available.—*Girton Mfg. Co., Millville, Pa.* (185D)

Automatic Nitrogen Generator produces the gas right at point of use to cut processing and packaging costs. Compact units (Nitroneals) generate 50-10,000 s.c.f./hr. (directly from ammonia and air), and can be operated by an unskilled worker attending the equipment ½ hr. per day.—*Baker & Co., 207 Grant Ave., E. Newark, N. J.* (185E)

New Portable Booms ease truck loading and warehouse piling, or may serve as highly flexible components of conveyor systems. Units (Handibelts), which incline up to 26 deg., are available in three lengths (11, 16, and 21 ft.) with 14- or 20-in.-wide belting.—*Standard Conveyor Co., 940 Indiana Ave., N. St. Paul, Minn.* (185F)

EQUIPMENT APPLICATIONS



Air-Conveying Setup Cuts Material-Handling Costs

Pneumatic unloading of bulk-sugar trailers at American Stores bakery, Philadelphia, has cut materials-handling costs in two ways. Besides realizing savings inherent in the bulk operation, the company has minimized maintenance by handling the product pneumatically.

To unload sugar, flexible steel hoses are hooked up to a trailer outlet. Hoses in turn are connected to a pneumatic conveying system (Airveyor, Fuller Co., Catasauqua, Pa.) consisting of steel tubing. Sugar is picked up by vacuum, then is transferred to a pressure air stream for distribution to bins.

Conveying lines are self-cleaning and there are no moving parts. A typical trailer load is 30,000 lb.

Circle 185G on Reader Service Card

Special Concrete Flooring Withstands Heavy Loads

After ten years of heavy hand-truck traffic, a special concrete flooring at Adelphia Coffee & Tea Co., New York City, still requires no maintenance.

For wear resistance, this flooring (Emeri-Crete, Walter Magnire Co., New York City) incorporates emery aggregate, one of the hardest substances known. This material is mixed with a high-grade cement to provide the heavy-duty flooring.

Circle 185H on Reader Service Card

For Faster and Better Clean-Up

USE

KLENZADE

DETERGENTS AND BACTERICIDES

CBS CLEANER

Exceptional emulsifying and saponifying powers scientifically balanced with rapid-action wetting agents for thoroughly removing stubborn fat and soil deposits. Ideal for hand cleaning of cookers, vats, fillers, etc. Rinses clean and bright. Tops in its field.

KLENZADE HC-6

Highly popular general cleaner especially useful on all wood and metal surfaces, tile, concrete floors, general processing equipment, ovens, hoods, etc. Rapid removal and dispersion of grease and heavy soil. Leaves no scum; rinses freely. Safe for hands.

FLASH-KLENZ

Non-corrosive organic acid detergent for cleaning high temperature equipment. Completely neutralizes and removes baked-on mineral deposits. The latest scientific approach to lime or "stone" dissolution. Eliminates abrasive methods.

KLENZADE XY-12

Concentrated sodium hypochlorite solution for bactericidal use in food plant operations. Rapid and effective for sanitizing all types of equipment. Clear solution, always ready for use. No dissolving or settling necessary. Leaves no sediment or residual film.

SPECIAL DETERGENTS

and equipment for high temperature and heavy duty cleaning. Also for sanitizing equipment and steam pressure cleaning.

Offices in Principal Cities

KLENZADE PRODUCTS, Inc.

BELOIT, WISCONSIN

See your wholesaler for

genetron® super-dry REFRIGERANTS

a complete line for your every need!

genetron 11—ORANGE LABEL TRICHLOROMONOFLUOROMETHANE	For industrial and commercial refrigeration and air conditioning systems using single or multi-stage centrifugal compressors. Can also be used for either direct or indirect expansion-type systems.
genetron 12—WHITE LABEL DICHLORODIFLUOROMETHANE **genetron 22**—GREEN LABEL MONOCHLORODIFLUOROMETHANE	Used in virtually all types of refrigeration and air conditioning equipment, large and small, household and industrial, direct and indirect expansion systems. Typical units in which "Genetron" 12 and 22 are used: refrigerators, freezers, frozen food lockers, window air conditioners, home or office console units, large custom-built units for commercial comfort or industrial processes, large store units, mobile units for transportation equipment, large home units for addition to present hot air heating systems.
genetron 113—PURPLE LABEL TRICHLOROTRIFLUOROETHANE	Used in 50-ton and larger centrifugal compressors, primarily for large comfort cooling systems, brine cooling systems, and other commercial and industrial air conditioning and refrigeration systems.
genetron 114$_A$—BLUE LABEL DICHLOROTETRAFLUOROETHANE	Used in centrifugal and rotary compressors for commercial, industrial and household refrigeration.

QUICK FACTS on genetron super-dry refrigerants

- Guaranteed exceptionally low moisture content
- Non-corrosive to standard equipment materials
- Non-toxic, non-flammable, stable, safe
- Critical and freezing points well outside range of operating uses
- Solvent action on oil helps prevent solidification or congealing of lubricant
- Freely interchangeable and may be mixed in any proportions with comparable fluorinated hydrocarbons meeting the same strict refrigerant specifications
- Aid in lubrication of equipment; generally miscible with oil
- Available everywhere, from refrigeration wholesalers throughout the country

GC Allied Chemical

genetron department
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

← For more data, circle this page number on card at back

Shoppers more and more reach for food brands protein fortified with PRO-80 Vital Gluten

Today's shoppers want protein-enriched foods to aid in weight reduction, to build strong muscles and for general health, energy, vitality. Recognizing this, many food processors now use General Mills Pro-80 Vital Gluten (80% protein on a moisture free basis) to bring their products to the desired protein level, to build strong brand preference. Pro-80 Vital Gluten is an economical, easy-to-use protein food ingredient for:

breads	puddings	health foods
baked goods	cereals	and many
macaroni products	baby foods	others

Pro-80, extracted from wheat, hydrates rapidly, blends smoothly, is bland and compatible—adds no taste or odor of its own. And its reasonable cost is repaid many times by creating premium products which you can merchandise to a vast, receptive market.

GET MORE FACTS FAST!

Send for booklet which tells how Pro-80 can build sales, profits.

Pro-80 Vital Wheat Gluten is made only by

SPECIAL COMMODITIES DIVISION

MINNEAPOLIS 1, MINNESOTA

General Mills

For more data, circle this page number on card at back →

JUST OFF THE PRESS

NEW CATALOGS AND BULLETINS —*Free For The Asking*

PLANT ENGINEERING

Flare Tube Fittings

Illustrates complete line of fittings made in brass, steel, stainless steel, and aluminum. Available in most shapes including new swivel nut type, and straight threaded fittings with o-rings. Catalog 4310, 52p.—*Parker Appliance Co., Cleveland (188A)*

New-Design Steam Trap

Furnishes clear sectional drawings, component details, piping hook-up, and physical data on a line of steam traps stated to have integral strainer, check valve, air venting through main valve, as well as bimetallic-stainless steel thermo-element, and other advantages. Catalog 600, 8p.—*Zelan Valve Corp., Plattsburg, N. Y. (188B)*

Food Floor Protection

Easy-to-read brochure explains construction, installation, and range of resistance of protective floor covering. Also has specifications, estimating data, and typical installations. 12p.—*Atlas Mineral Products Co., Mertztown, Pa. (188C)*

Plastic Properties Chart

Tables physical, chemical, thermal, electrical, and mechanical data for nine physical forms of seven different plastics. 4p.—*Commercial Plastics & Supply Corp., New York City (188D)*

Waste, Water Treatment

Catalogs and offers four complete bulletins on each unit of a line of water and waste treatment equipment. Specific units include those for acration, chemical feeding, control, filtration, ion exchange, and others. Bulletin 80, 32p.—*Infilco Inc., Tucson, Ariz., (188E)*

Quick-Connect Coupling

Describes coupling for fluid line that hooks up quickly and closes both openings when disconnected. Will withstand highly corrosive and high temperature chemicals. Bulletin 270, 2p.—*Snap-Tite, Inc., Union City, Pa. (188F)*

Stainless Steel Piping

Catalogs new line of stainless pipe fittings. Photos, diagrams, and engineering data are included. 22p.—*Horace T. Potts Co., Philadelphia (188G)*

Porcelain Enamel Uses

Pocket-sized booklet deals with development of porcelain enameling and its application in such uses as meter dials, oil seal shoes, and color standards. Company points out its ability to produce special parts. 20p.—*Erie Ceramic Arts Co., Erie, Pa. (188H)*

Air Conditioning Units

Has facts on two multi-zone units that circulate, heat, cool, humidify, dehumidify, and clean air. Offering as many as 56 coil combinations, they are claimed capable of conditioning up to 16 separate zones. Specification Sheet C-1100-S134P, 2p.—*Worthington Corp., Harrison, N. J. (188I)*

Adjustable Link V-Belt

Describes adjustable link V-belt that is stated to give less vibration and faster belt changing. 4p.—*Manheim Mfg. & Belting Co., Manheim, Pa. (188J)*

Conveyors, Power Chains

Covers line of conveyor, elevator, and power transmission chains including some new developments. Has useful installation information. 8p.—*Moline Malleable Iron Co., St. Charles, Ill. (188K)*

Stainless Steel Data

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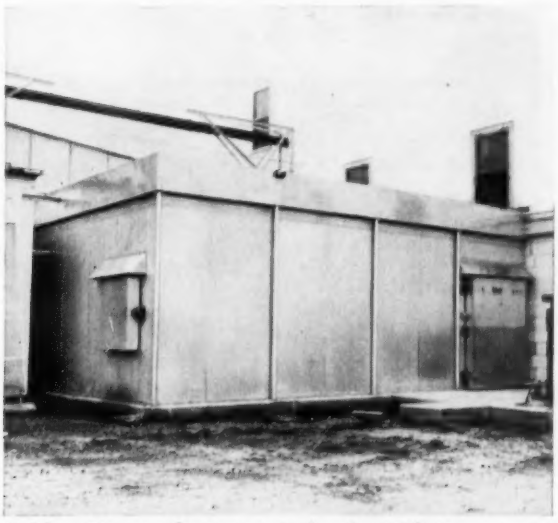

Problem: No room for storage in the plant! Solution: concrete slab was poured in the back yard of Pure Food Company, Westchester, N. Y.—and the Armorply room was built on the slab. Armorply's metal faces reflect away sun's heat in summer—keep operating costs down.

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stainless steel properties, applications, corrosion resistance, fabricating, and availability. Blue Data Sheets, 146p.—*Allegheny Ludlum Steel Corp., Pittsburgh. (188L)*

Scotch Marine Boiler

Gives data for line of 14 sizes of Scotch Marine steel boilers. File No. 40-C-1, 4p.—*Federal Boiler Co., Midland Park, N. J. (191A)*

Speed Reducer Line

Pictures speed reducer units for direct and V-belt drives, ½ to 50 hp. CBS 7-699, 8p.—*Strong-Scott Mfg. Co., Minneapolis. (191B)*

Unit Fire Detector

Describes hermetically sealed fire detecting units that are actuated at selected levels regardless of how slowly the surrounding temperature rises. Has comprehensive technical data. Brochure MC-107B, 4p.—*Fenwal, Inc., Ashland, Mass. (191C)*

Diaphragm Control Valves

Two new specifications give construction details on single and double seated diaphragm control valves. Included are sizes, materials, flow characteristic curves, dimensions, and a cross-section drawing of each type. Specifications S810-11, 12, 8 p.—*Minneapolis-Honeywell Regulator Co., Philadelphia. (191D)*

Battery Buying Guide

Illustrated reference booklet outlines significance of battery design, and a 4-point program for battery users. Booklet GB-1788, 16p.—*Gould-National Batteries, Inc., Trenton, N. J. (191E)*

Quick-Dump Valves

Introduces four-way, five-port valves that have no internal springs, packings, pistons, or sliding metal-to-metal contact. Valves are electrically or hand-operated. 2p.—*General Gas Light Co., Kalamazoo, Mich. (191F)*

Oil Burners, Heaters

Describes line of burners for any grade of fuel oils that offer individual adjustment of oil and air, and oil heaters that have automatic temperature control. Data Sheet 409A, 709B, 8p.—*Hauck Mfg. Co., Brooklyn, N. Y. (191G)*

Plastic Pressure Tubing

Has application story and data on small diameter plastic tubing with high-pressure rating, and accessories for installing it. 4p.—*Polymer Corp. of Pennsylvania, Reading, Pa. (191H)*

For Leveling Machinery

Concerns combination leveling-mount and vibration dampener. 1p.—*Felter Co., Boston. (191I)*

MATERIAL HANDLING

Steel Shipping Container

Outlines construction and use of 12-gage steel shipping containers. Advantages claimed for these units are elimination of bags and warehouse, hermetic sealing, bulk sales. 12p.—*Delta Tank Mfg. Co., Baton Rouge, La. (191J)*

Twelve Conveyor Styles

Details applications of twelve different conveyor units. Engineering drawings, data charts, and photos describe each. Bulletin 64, 42p.—*Standard Conveyor Co., North St. Paul, Minn. (191K)*

Floor Trucks

Includes trailers, drag-line trucks, dollies, jacks and skids, wagon trucks, barrel-handling equipment, and 2- and 4-wheel platform trucks. Has specifications and in-use illustrations. Booklet 57-S, 28p.—*Nutting Truck & Caster Co., Faribault, Minn. (191L)*

Plate-Top Roller Chain

Illustrates conveyor with snap-on nylon top plates. Advantages claimed are smooth conveying, no need for lubrication, and economy. Bulletin 57-12, 4p.—*Chain-Belt Co., Milwaukee. (191M)*

Hydraulic Lift Truck

Has illustrations and data for a line of hydraulic lifters including straddle trucks, drum handlers, and other special and general-purpose trucks. 12p.—*Big Joe Mfg. Co., Wisconsin Dells, Wis. (191N)*

Gas-Powered Lifter

Folder, in color, has complete specifications for a line of gas-powered, cushioned tire, fork trucks. Driver convenience, advanced power train, easy maintenance, safety upright, and brakes are stressed. Bulletin SF 2081, 6p.—*Clark Equipment Co., Battle Creek, Mich. (191O)*

Rubber Tired Wheels

Explains advantages of rubber tired wheels for floor trucks, trailers, and casters. Specifications are given, and step-by-step illustrations cover easy-to-replace tire feature. Bulletin D, 4p.—*Nutting Truck & Caster Co., Faribault, Minn. (191P)*

Industrial Truck Battery

Describes battery developed specifically for requirements of industrial electric trucks. Full details of battery construction including

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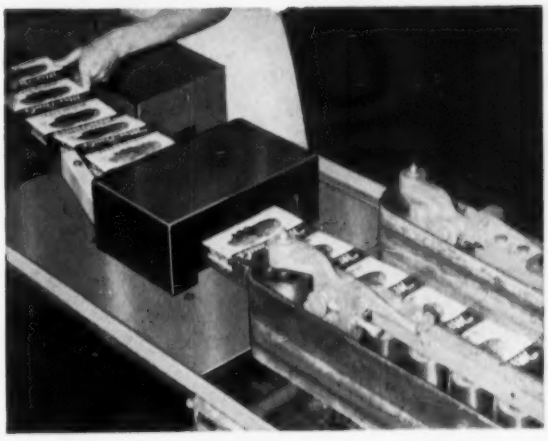

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grid plates, regenerative oxide, glass-tape insulation, porous separators and platainers, and high-impact rubber covered jars are given. Form ZB1567B, 8p.—*Gould-National Batteries, Inc., Trenton, N. J. (191Q)*

Bulk Sugar Handling

Has discussion of means and equipment available to handle dry sugar in bulk. 7p.—*Lanborn & Co., New York City (192A)*

Conveyor Belt Reference

Contains general information on belt terminology, construction, fabric designation, rubber grades, and commercial specifications. Also has recommendations for use of various belt offerings under specific conditions. Catalog 25 CB, 22p.—*Raybestos-Manhattan, Inc., Passaic, N. J. (192B)*

Rubber Floor Pads

Gives data on rubber pads said to reduce plant floor and loading dock maintenance cost, and cut product damage by absorbing shock of dropped loads. B-1257, 2p.—*Bumpers, Inc., Cleveland. (192C)*

Gravity Wheel Conveyors

Catalogs gravity wheel conveyor line with photos, diagrams, specification tables, and description. Many aluminum and steel accessories are also described. Catalog FA-102A-1, 16p.—*Sage Equipment Co., Buffalo, N. Y. (192D)*

PROCESSING

Sanitary Blender

General description of blender aided by close-ups of sanitary features. Specifications are listed and photos show other equipment lines. *4p.—Falcon Mfg. Div., Brooklyn. (192E)*

Hammer Shredders

Includes installation photos, details of construction and operation, dimension drawings, and general specifications of a line of hammer-type shredders, grinders, and hashers. Catalog 907, 16p.—*Jeffrey Mfg. Co., Columbus, Ohio. (192F)*

Cooling Units

Covers 1-, 2-, and 3-roll cooling units, conveyor coolers, and tunnel coolers. *Bulletin RC-1, 4p.—Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J. (192G)*

Ultrasonic Processor

Considers an ultrasonic unit said to be useful for cleaning and descaling, emulsifying, and mixing. Both magnetostrictive and barium titanate transducers are available. Bulletin DR-2,000, 2p.—*Acoustica Associates, Inc., Glenwood Landing, N. Y. (192H)*

Air Filter Arrangement

Shows how interchangeable arrangement of cartridge-type air filter permits change of efficiency. Also describes filter guaranteeing 99.95% efficiency on 0.3 micron particles. Bulletin 120, 4p.—*Cambridge Filter Corp., Syracuse, N. Y. (192I)*

Liquid or Slurry Feeder

Continuous volumetric feeding of liquids and slurries by means of a rotary dipper wheel is described. Typical process installation is drawn. Bulletin 65-812B, 4p.—*Omega Machine Co., Providence, R. I. (192J)*

Wet Processing Units

Shows offering of homo-mixers, colloid mills and agitators. Discusses operation, specifications, dimensions, applications, advantages and possible modifications for various models of these units. Catalog 600, 24p.—*Gifford-Wood Co., New York City (192K)*

Filter Leaf Design

Has discussion of importance of properly designed filter leaves. Multi-Matter, Vol. II, No. 1, 4p.—*Multi-Metal Wire Cloth Co., New York City (192L)*

Fixed Filter Types

Concerns disposable media gravity, combination gravity and magnetic, magnetic, vacuum, pressure, and screen-type settling filters. Applications run from water to heavy viscosity oils. General Bulletin, 8p.—*Industrial Filtration Co., Lebanon, Ind. (192M)*

Chemical Feeding Unit

Outlines components of air or water-operated diaphragm feeder designed to safely handle concentrated chemicals. Pumping rates vary from 0.8 to 8.0 gallons per day. Bulletin 1913, 2p.—*Proportioneers, Inc., Providence, R. I. (192N)*

Filter Cartridges

Shows construction and components for white cellulose filter cartridge that can take flow rates as high as 1,000 gpm. Different cartridges will accommodate water, or a number of different foods. Catalog 53-100, 8p.—*Cuno Engineering Corp., Meriden, Conn. (192O)*

Transverse Spraying Units

Covers four types of transverse spray units—horizontol straight line, horizontal contour, vertical straight line, and vertical contour.

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Fruit Processing Units

Two bulletins cover equipment selection including sugar elevator, fruit elevator, shaker washer, slicer, and slicer-mixer. 12p.—*H. A. Reinhardt Co., Newtown, Ohio. (195A)*

Stainless Steel Tanks

Has photos, dimension data, and description of special components for a number of models of stainless steel mixing and storage tanks. Bulletin 941, 2p.—*Pfaudler Co., Rochester, N. Y. (195B)*

INSTRUMENTS

Flow-Meter Systems

Informs of bearingless turbine-type flow meter system available with recorders, totalizers, converters. 6p.—*Potter Aeronautical Corp., Union, N. J. (195C)*

Temperature Indicators

Lists features, specifications, and ranges for standard-case instrument with door-mounted switches, small-case instruments with separately-mounted switches, and console for desk-top mounting, for as many as 200 thermocouple points. Data sheet ND46-33(23), 4p.—*Leeds & Northrup Co., Philadelphia (195D)*

Food Level Controls

Concerns unit for automatic electronic control of level of milk or other liquid food in any container. Levels to 1/100 of an inch can be maintained. Bulletin FM-FMF, 4p.—*Lumenite Electronic Co., Chicago. (195E)*

Proximity Level Control

Explains action of an automatic electronic probe device that senses proximity of liquid, granular, and solid materials. Connected to a power relay, unit acts as a level control.—*Excel Electric Service Co., Inc., Chicago. (195F)*

Viscosity Meter

Furnishes information on installation and applications of a continuous viscosity recording unit. Form BUB1, 4p.—*Bendix Aviation Corp., Cincinnati. (195G)*

Pneumatic Controllers

Treats of small-case indicating pneumatic controllers for temperature and pressure. Temperature ranges between 0 and 1,000 F, and pressures from 0 to 1,000 psi. are available. Catalog C600/701, 8p.—*Minneapolis-Honeywell Regulator Co., Philadelphia.*

Thermometers, Hydrometers

Lists thermometers and hydrometers. Also contains directions for reuniting mercury in thermometers, and general facts about use of hydrometers. Bulletin 40, 28p.—*Central Scientific Co., Chicago. (195H)*

Control Center

Four-color presentation describes functions, uses, and advantages of electronic control centers for heating and air conditioning systems. Illustrates features including schematic diagrams, remote control point adjustment and temperature indication recording. Booklet F8031, 18p.—*Barber-Colman Co., Rockford, Ill. (195I)*

Metal Detector Series

Informs on metal detecting units that react to any metal with constant sensitivity at conveyor speeds up to 1,000 fpm. Dimension drawings and specifications are included. Catalog E.41, 4p.—*Radio Corp. of America, Camden, N. J. (195J)*

INGREDIENTS

Corn Syrups, Sugars

Covers types, manufacture, characteristics, compositions, chemical and physical properties, handling procedures, and analytical examination of corn syrups and sugars. Index has data tables and a glossary. 48p.—*Corn Industries Research Foundation, Inc., Washington, D. C. (195K)*

Summer Sausage Culture

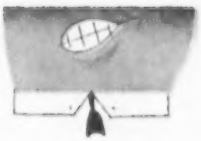
Contains seven steps to control production of tangy summer sausage when using lactic acid starter culture. Circular 22, 4p.—*American Meat Institute Foundation, Chicago. (195L)*

Glycerine Report

Treats of commercial grades, definitions, specifications, test methods, and shipping and storage requirements of glycerine. AOCS method for determination of glycerine is described, and information is given on containers, shipping, handling, and storing of refined glycerine. 19p.—*Glycerine Producers Ass'n., N. Y. C. (195M)*

Isoascorbic Antioxidants

Details physical and chemical properties, and applications of isoascorbic acid and sodium isoascorbate. The new isoforms are described as having antioxidant activities equivalent to the vitamin



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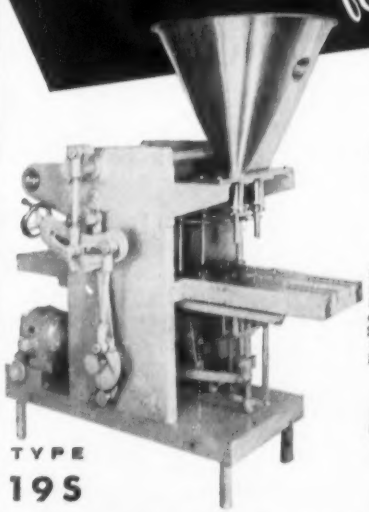

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forms. Bulletin 523, 5p.—*Chas. Pfizer & Co., Inc., Brooklyn, N. Y. (195N)*

Flavors, Colors, Oils

Lists prices of selection of flavors, spices, and other ingredients. 26p.—*Magnus, Mabee & Reynard, Inc., New York City. (196A)*

Antioxidant Mixtures

Charts structural formulas, properties, composition, and popular applications of various antioxidants. Lists present applications. 4p.—*Eastman Chemical Products, Inc., Kingsport, Tenn. (196B)*

Food Grade Antioxidant

Discusses oxidation problems and controls, and use of butylated hydroxy toluene antioxidant in a number of foods and packaging materials. Bulletin AB-3, 8p.—*Catalin Corp. of America, New York City. (196C)*

Butter Extractive

Discusses production and applications of a natural flavor made entirely from fresh butter. 6p.—*Sterol Derivatives, Inc., Los Angeles. (196D)*

Lemon Juice Applications

Attractive color folders have quick notes on lemon juice, explain functions of its use in a variety of foods. 8p.—*Sunkist Growers, Ontario, Calif. (196E)*

Vegetable Coloring

Introduces yellow-to-orange vegetable coloring offered commercially in both water-soluble and oil-soluble types, and microcrystal, powder, and liquid forms. Extracted from annatto, the product has been used successfully for more than a year. 12p.—*S. B. Penick & Co., New York City. (196F)*

Irish Moss Information

Special technical issue dealing with Irish moss products has table listing stabilizer characteristics. Proper use of this ingredient and advantages to be gained are also explained. Seakem Extract, Winter, 1957, 8p.—*Seaplant Corp., New Bedford, Mass. (196G)*

Flavor Concentrates

Lists wholesale prices of concentrated colors, flavors, gums, essential oils, and fixatives, April, 12p.—*Fritzsche Bros., Inc., New York City. (196H)*

PERSONNEL

Research Awards Winners

Presents winner of research awards administered by professional and scientific associations. 20p.—*The Borden Co. Foundation, Inc., New York City. (196I)*

First Aid Supplies

Kits for amonia, acid, and alkali burns and other accidents are described and priced. 9p.—*E. D. Bullard Co., San Francisco. (196J)*

Freezer Wear Styles

Shows over 30 types of garments for men working in refrigerated rooms. 8p.—*Freezer Clothing Sales Co., Silver Spring, Md. (196K)*

Safety Data Sheets

Lists sheets giving facts on specific safety problems. 4p.—*National Safety Council, Chicago. (196L)*

Employee Testing Media

Tests of intelligence, interest, personality, as well as aptitudes and skills are catalogued. Also has other aids for personnel department. 36p.—*Science Research Associates, Chicago. (196M)*

Insulated Freezer Wear

Describes under-all insulated suit for use in sub-zero temperature room. 4p.—*Brooks Insulated Clothing Co., New York City. (196N)*

MANAGEMENT

Grocery Product Survey

Reports results of survey giving distribution of various brands in 77 different classifications of grocery store merchandise. Survey 10, 75p.—*Scripps-Howard Newspapers, New York City. (196O)*

Food Plant Insurance

Unfolds panorama of growth of insurance coverage for food processing industry. Has photos and graphs. 20p.—*Canners Exchange, Chicago. (196P)*

Business Forms, Devices

Illustrates paper business forms and dispensers, and lists prices for each. 24p.—*Alfred Allen Watts Co., Clifton, N. J. (196Q)*

Writing Machines

Shows, in simple pictorial fashion, how common language punch

PRODUCT NEWS FROM Pfizer

L-LYSINE

(monohydrochloride)

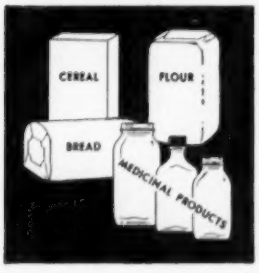
with NO D-isomer

produced by fermentation... now available in quantity

• Through its leadership in fermentation chemistry, Pfizer now offers pharmaceutical and food manufacturers the essential nutrient L-lysine in practical commercial quantities. A unique fermentation process assures that only the biologically active L-isomer is produced.

In the average human diet lysine is more deficient than any of the other eight essential amino acids.

Volume production of Pfizer L-lysine means you can offer an important new health plus in your products. In medicinal products Pfizer L-lysine should have special significance in meeting the nutritional needs of children, pregnant women, older people and those who are recovering from illness. In cereal food products, particularly wheat products,* Pfizer L-lysine can improve the amino acid balance to a level comparable to that of high quality animal proteins.



Write us if you would like further information about Pfizer L-lysine, and a free sample. Pfizer Technical Service men can also help you in taking advantage of this important new development.

*Before adding L-lysine to food products, manufacturers should check Federal and State standards of identity.

Manufacturing Chemists for over 100 years.

Pfizer

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Chemical Sales Division

630 Flushing Ave., Brooklyn 6, N. Y.

Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas

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IMPACT! *adds sales punch!*

IMPULSE! *sparks point-of-purchase buying!*

IMPROVEMENT!
brings you the newest in glass!

The Three Hazel-Atlas "Imps" Say—

chicks, oodles of noodles, and minced meats —bees, beans, and slaw treats

. . . sell better in our glass packages!

Whatever you pack, it will get more sales *impact* and produce more *impulse* sales in beautiful H-A packages, because:

1. Your foods' appetizing color and shape are salesmen with *silver tongues*, when you let them speak for themselves in a beautiful H-A container. Fruits, vegetables, meat, preserves—all products keep their fresh personality when their natural beauty is displayed in a crystal-clear H-A jar.

2. You give your product two selling lives when you pack in an H-A decorated tumbler—*first* selling your food with sparkling design and color from the self-service shelf, *continuing* to sell in the consumer's home as an often-seen re-use container.

Rigid quality-controls keep H-A containers uniform in size, shape, clarity and color. You are sure of fast, dependable delivery service during sales peaks and emergencies, served by H-A's nationwide network of glass plants and warehouses. For details, ask your nearest H-A representative.

...glamour in glass!

HAZEL-ATLAS GLASS

Division of CONTINENTAL CAN COMPANY
WHEELING, WEST VIRGINIA

paper tape can be created. Units can integrate other business equipment or actuate same type of unit to produce documents, completely automatically, at 100 words per minute. 24p.—*Friden Calculating Machine Co., Rochester, N. Y. (196R)*

Kansas Industrial Sites

Considers, in full color, the industrial resources of Kansas. Covers many aspects of basic plant location data. 46p.—*Kansas Industrial Development Commission, Topeka, Kans. (199A)*

Pocket Radio Pager

Touch of button singles out particular key persons by buzz and delivers message to radio pager that he carries in his pocket, according to new bulletin. Several variations of system are available. Bulletin ATIC-968, 4p.—*Motorola Communications & Electronics, Inc., Chicago. (199B)*

SANITATION

Brewer's Sanitation Guide

Suggests use of mechanized equipment and special compounds for brewery cleaning jobs. Control of slime, odors, and corrosion, plus bottle-washing practice and conveyor chain lubrication are also covered. Bulletin S. 8021 R3, 12p.—*Oakite Products, Inc., New York City (199C)*

Fungistatic Paint

Has facts on a vinyl latex paint said to make walls permanently bacteria-proof and fungus-free. Product is claimed to be high quality, long-lasting, and non-poisonous. 4p.—*Charles Bowman & Co., New York City. (199D)*

Steam-Jet Cleaner

Considers operation of electric steam-jet cleaner. Portable unit delivers steam or hot water at pressures up to 500 psi. Bulletin JC-100-1, 6p.—*Pantex Mfg. Corp., Pawtucket, R. I. (199E)*

Bakery Rodent Controls

Details Bakery rodent control problems, the responsibility for their solution, and methods for control. Describes poisons and traps for mice and rats and methods for preventing their entry into bakeries. *Bulletin 150, 6p.—American Society of Bakery Engineers, Chicago. (199F)*

The CAMCO "WALKING BEAM" UNIT

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CAMCO-THERMAL-SYSTEMS, guarantee Precise-Uniform equal treatment of each container.

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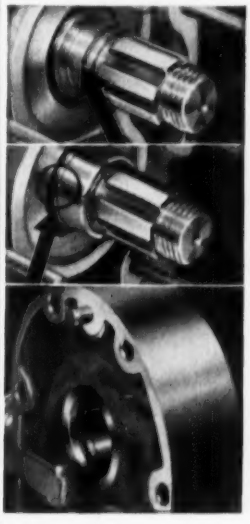
PORTLAND OREGON ★ SAN FRANCISCO CALIF. ★ CHICAGO ILLINOIS ★ FLUSHING NEW YORK

new THE MOST PERFECT SEAL FOR YOUR PRODUCT IN WAUKESHA P. D.* SANITARY PUMPS

New Waukesha Sanitary Pump with Vented Cover.

No product leakage . . . no intake of air with the new Twin O-Rings in WAUKESHA PUMPS. Sealing is engineered to handle vacuums up to 27 inches of mercury; pressures up to 150 PSI.



Here's How The O-Twins Work

Picture at left shows one O-Ring fitted to the shaft. Known as the shaft sleeve seal rubber, it not only seals but provides exact positioning of the impellers.
Next picture shows the stainless steel sleeve which fits on shaft *over* the O-Ring. Arrow points to pin which fits a slot in the sleeve so that sleeve and shaft *must* rotate together. No galling, no siezing, no misalignment, no shaft wear! And no leakage!

Where's the Other Twin?

It's located in the pump body as the 3rd picture shows. When cover and pump body are together, the stainless steel shaft sleeve rotates *inside* this ring. Again, no shaft wear at this point. The sleeve is reversible — doubles its life.

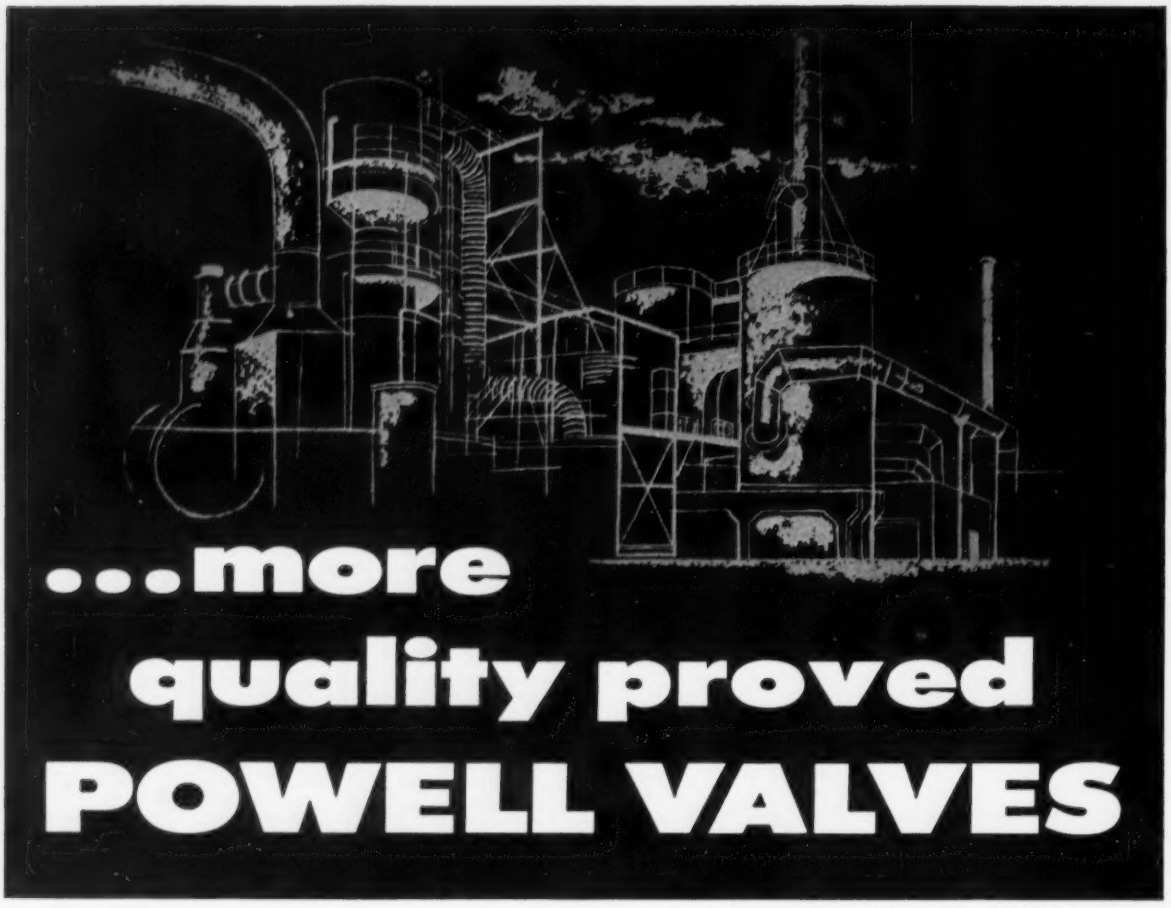
But these are only three of the features in the NEW WAUKESHA PUMP — there are 18 in all — to make your choice of WAUKESHA more profitable with far less maintenance and far longer service-life, get in touch with your WAUKESHA distributor.

Here's WAUKESHA'S 1957 Catalog to tell you the whole story of WAUKESHA Pumps. Tell us what product you handle. Send a postcard today.

*Positive Displacement

Waukesha FOUNDRY COMPANY

Dept. A-5, Waukesha, Wisconsin



...more quality proved POWELL VALVES

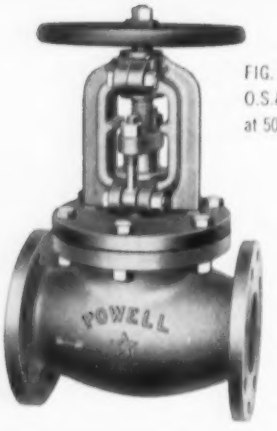
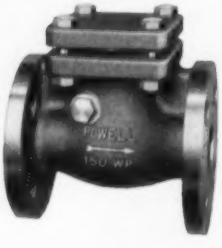


FIG. 2429—Large Size Stainless Steel O.S.&Y. Globe Valve for 150 Pounds W.P. at 500 F. or 230 W.P. at 100 F.

FIG. 1314A—1500-Pound Integral Bonnet Stainless Steel "Y" Valve.

FIG. 2453SG—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.



Designed for long life, designed for dependable service

Consult your Powell Valve distributor for all the facts about quality proved bronze, iron, steel and corrosion-resistant valves. For every flow problem . . . there is a Powell Valve to solve it.

THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

Ninety million fish a year pass over this Wissco Belt. This belt, costing 30% *less* than those previously used by North Atlantic, has already lasted over 16 times longer.

WISSCO BELTS *and the*
North Atlantic Fish Company

The story of Wissco Belts is best told by their users. For instance, President Frank Cefalo of North Atlantic Fish Company, Gloucester, Mass., reports:

"By switching to a Wissco Belt in 1948, we eliminated semi-annual belt replacements . . . increased our production flow by 100% . . . reduced our labor force by 8 men . . . and effected, *in addition*, a direct, immediate cost saving of at least $15,000 annually."

And he goes further. "Not only is the Wissco Belt more durable than any other belt we've ever used, but it performs its function with greater efficiency. Since ours is a volume production operation, we're able to get our products to the market faster—a factor that has improved our overall profit situation."

North Atlantic uses their Wissco Galvanized Balanced Spiral Belt to convey fresh fish from the dock up a 30% incline to a weighing station. As the fish move along the belt, workers remove ice left on the fish when they leave the trawlers. "With the belts we previously used, the fish continually slipped back down the belt," Mr. Cefalo continues. "So we had to use sixteen men on this station—most of whom were engaged in a constant, irritating and expensive battle to keep the fish on the belt. Now, the wire mesh surface of our Wissco Belt has eliminated this problem, allowing us to reduce the men on this station to eight.

"In addition, our Wissco Belt does not loosen, crack or part at the seams when exposed to moisture from the fish and ice chips. These failures occured on an average of once a week with the belts we formerly used. The resultant work stoppages immobilized 150 workers throughout the entire plant for at least an hour and a half each time. Elimination of these stoppages, through installation of a Wissco Belt, saved us $300 a week in direct costs, plus a gain in our overall production figures."

If you have a processing or conveying operation, chances are that Wissco Belts can help you as they have helped the North Atlantic Fish Company. It will pay you to get the complete story today from our nearest sales office.

CF&I **WISSCO BELTS**

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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If you make any of these...

See how you can profit from Quaker's processing experience and facilities!

Whatever your product's specifications, give them to Quaker. We can meet a wide variety of specifications and we may save you time and money as well.

Here's how! Quaker, through its tremendous resources, offers a wide variety of grains. You can have any size granulation—from original grain to microscopic size. And these products have almost *unlimited* application in food processing. For example, Quaker's oats, corn, barley and rice are extremely neutral. Used as thickeners or carriers they may assume, accent or eliminate certain characteristics of other ingredients.

Quaker's continual quality control assures uniform high quality products. This eliminates costly and time consuming rejects. And Quaker can often offer freight savings by combining orders in mixed car shipments. Its mills, located throughout the country, assure you of quick service and more favorable freight rates. And Quaker is equipped to handle bulk, too—another saving for you.

Chances are there's a Quaker product or processing development that can help make *your* product better or at a lower cost. Contact the Industrial Sales Department, The Quaker Oats Company, Merchandise Mart, Chicago 54, Illinois.

QUAKER

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CHICAGO 54, ILLINOIS

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USEFUL NEW BOOKS

& GOVERNMENT PUBLICATIONS

New Guide to Food Preservation

STERILIZATION IN FOOD TECHNOLOGY *By C. Olin Ball and F. C. W. Olson. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 36. 1957. 653 pages, cloth. Price:* $16.

Another in the publisher's Food Technology Series, this volume offers the food man a complete and comprehensive guide to food preservation. As noted in the subtitle, the book deals with "theory, practice, calculations."

The results of more than 20 years work on the engineering aspects of high temperature sterilization and the mathematics involved in thermal processing are presented by the authors. The method of predicting lethal effects of sterilizing, evolved by Dr. Ball and discussed here in detail, has served as a standard in the canned food branch for more than 25 years.

Past and present means of sterilization are described, bringing the reader up to date on the newest in methods and equipment.

The Problem of Training Engineers

ENGINEERING ENROLLMENT IN THE UNITED STATES *Edited by Norman N. Barish. Published by New York University Press, Washington Square, New York City 3. 1957. 226 pages, cloth. Price:* $7.50.

What kinds of engineers are we training? What is the outlook for engineering enrollment in the future?

The author answers these question, and many others, basing his conclusions on available statistics in engineer education in the United States.

He clarifies some of the accepted trends and compares them between individual schools and the entire nation. A chapter on Russian engineer education has been included to offer some international comparision.

From Aerobacter to Zymosan

DICTIONARY OF MICROBIOLOGY *by Morris B. Jacobs, Maurice J. Gerstein, and William G. Water. Published by D. Van Nostrand Co., Inc., Princeton, N. J. 1957. 276 pages, paper. Price:* $6.75.

More than 5,000 individual entries make up this handy reference for food men. It covers topics from antibiotics to air purification.

It gives at a glance the classification, motility, morphology, physiological and cultural characteristics, habitat, differentiation, pathogenicity and industrial utilization of a given microorganism.

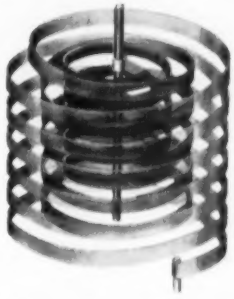
Also, details are offered on all the important culture media and methods, apparatus, and tests. The data on enzymes is of particular interest to food men.

Industry and the Electronic Brain

AUTOMATION: ITS PURPOSE AND FUTURE *By Magnus Pyke. Published by Philosophical Library, 15 E. 40th St., New York City 16. 1957. 191 pages, cloth. Price:* $10.

Here is another treatment of the electronic brain and the part it plays, present and future, in industry. The

THE
REVERSE TWIST



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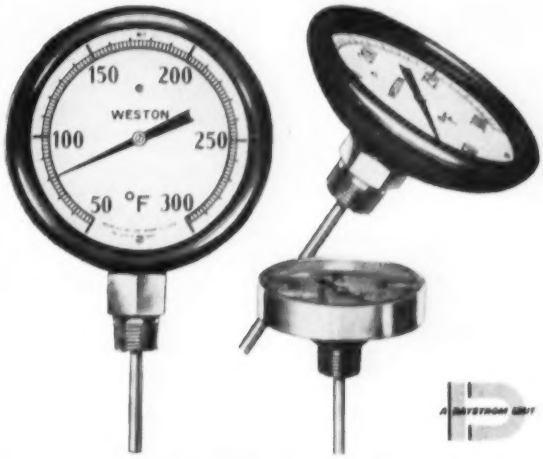
You can readily picture the difference. In the Weston industrial bi-metal thermometer the sensitive element is a *multiple* helix rather than the conventional single one. Therefore a longer bi-metal strip can be used, yet it can be wound into a shorter element with greater rigidity and stability, better repeatability, fast thermal response and the ability to withstand high overloads. In service this means sustained accuracy, over longer periods, at far lower over-all costs. Available in types, sizes and ranges for industrial applications and all built-in needs. Catalog T-13-K gives the complete story. Write . . . WESTON Electrical Instrument Corp., 617 Frelinghuysen Avenue, Newark 5, N. J.



WESTON
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THERMOMETERS

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Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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SIMPLEX FILLER

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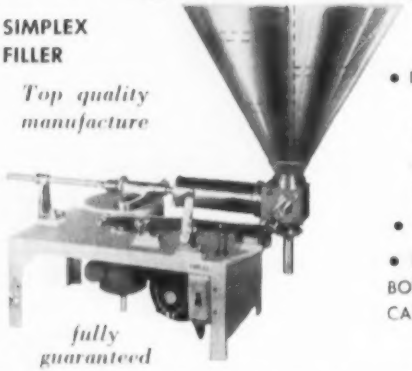

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- HANDLES LIQUIDS AND SEMI-SOLIDS!
- ADJUSTABLE 1 TO 32 OZ.!
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author details the development of the electronic computer and how it has been adapted to the mass-production industries.

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Booklets & Reports

SOYBEAN BLUE BOOK. *Published by American Soybean Assn., Hudson, Iowa. 160 pages. Price* $3. *1957 guide to soybean industry.*

TECHNICAL DATA ON PLASTICS. *Published by Manufacturing Chemists Assn., Washington, D. C. 224 pages. Price:* $3.25. *Properties of all commercially produced plastics.*

MATERIAL HANDLING. *Published by Material Handling Institute, Inc., Pittsburgh 22. 12 pages, paper. Price:* $.50. *Discussion of general rules, analysis, and cost data.*

RADIOLOGICAL HEALTH HANDBOOK *(PB 121784) Published by U. S. Dept. of Health, Education & Welfare, Washington 25, D. C. 356 pages. Price:* $3.75. *Guide to radiation safety.*

FINANCIAL APPROACH TO INDUSTRIAL OPERATIONS. *Published by Society for Advancement of Management, New York City 11. 23 pages. Price:* $1.50. *Financial decisions as the key to progressive management.*

MATERIAL HANDLING, PLANT LAYOUT, MAINTENANCE, RELATIONSHIPS TO OTHER DEPARTMENTS. *Published by the Material Handling Institute, Inc., Pittsburgh 22. 10 pages. Price:* $.50. *Materials Handling as part of the management operation.*

Infiltration

YOUR PROBLEM?

New King **KOLD WALL VESTIBULE**

Traps Warm Humid Air before it enters your cold room . . .

A completely new idea. Eliminates former Vestibule shortcomings of ice on the floor, frozen doors, frost on product and malfunction of refrigeration equipment. Installed at the walk-in door, the aluminum wall and ceiling panels are always at cold room temperature. Infiltrating humid air is immediately trapped in the Vestibule, where the moisture is held on the panels. Defrosting is accomplished by brushing the walls or unlatching panels for removal to a warm room. Rigid angle iron framework, double swing self-closing doors.

Panels demount easily for defrosting

Write for detailed technical bulletin

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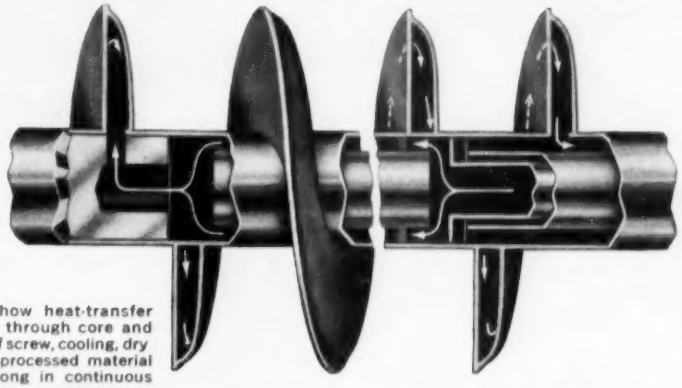
MFRS. OF SHARP FREEZE, COOLING, VENTILATING AND HEATING SYSTEMS

Do HOLO-FLITE savings like these suggest profit-boosting applications in YOUR plant?

Holo-Flite—the revolutionary screw-conveyor-type heat exchanger that cools, dries or heats materials in continuous bulk flow, has many applications throughout the process industries—applications that save time, save space, save labor and improve product quality. For example, in the Sugar industry alert operators have found Holo-Flite the ideal solution to a wide range of processing problems . . .

holo-flite* INSTALLATIONS IN SUGAR INDUSTRY NOW COOL 1.6 BILLION POUNDS PER YEAR!



Arrows show how heat-transfer medium flows through core and hollow blades of screw, cooling, drying or heating processed material as it moves along in continuous bulk flow.

In the Sugar industry alone, Holo-Flite equipment cools more than 1,600,000,000 lbs. a year. And this is just one of many industries where Holo-Flite's many installation and operating advantages are making major savings possible.

*"Holo-Flite" T.M. Reg.

HOLO-FLITE

IN-PROCESS USE

- Holo-Flite cools granulated or powdered sugar with equal ease!
- Discharge can be directed into multiple points of use, and dehumidified air is seldom necessary!
- Ideal for pre-cooling sugar going into cake mix and confection-coating processes!
- In candy making, Holo-Flite cooled sugar prevents distillation of essences and delicate flavors!
- With Holo-Flite, sugar is cooled as needed, eliminating costly bulk refrigeration prior to use!

HOLO-FLITE

BASIC SUGAR PRODUCTION

- Sugar cooled by Holo-Flite is free-flowing for quick, simple bulk car loading!
- Quality is uniformly high without perceptible crystal degradation!
- Cooling method is dust-free, eliminating need for troublesome bag collectors!
- Efficient Holo-Flite design permits easy clean-out (although this is generally unnecessary)!
- Holo-Flite can easily be mounted on loading bridge over hopper cars to maintain outlet temperature levels from cooler to car!
- The Holo-Flite heat exchange principle is equally adaptable to use of cooling tower water, refrigerated water systems or recirculated refrigeration media!

Let us send you descriptive literature and make recommendations for your processes. No obligation, of course!

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Which milk product is best for you?

Sweet Dairy Whey

A superior dairy ingredient that improves quality and reduces cost.

Lactose

The low-sweetening sugar that works wonders in food formulas.

New Teknikan

The most economical source for that well known special dairy solids flavor.

Angel-Whip

High quality, low cost whipping agent... increases tenderness, shortness and shelf life.

Powdered Milks

Whole milk (28% and 26% fat), High Heat, Low Heat and Instant Nonfat Dry Milk...all of Extra Grade quality.

This dairy product family is tailor-made for the food industry. The wide range of available products will permit you to take full advantage of the specific parts of milk needed in your formulas... from pure Lactose to Powdered Whole Milk. Buy these products individually or in prepared blends for particular applications.

Each shipment from Western Condensing Company is quality controlled for uniformity and dependability. Why not let us show you how the use of these rich dairy ingredients can improve your products and your profit picture?

What can we do to help you?

For working samples and detailed bulletins (be sure to state application), please write our Technical Service Department 116.

Remember, when you think of milk products, think of...

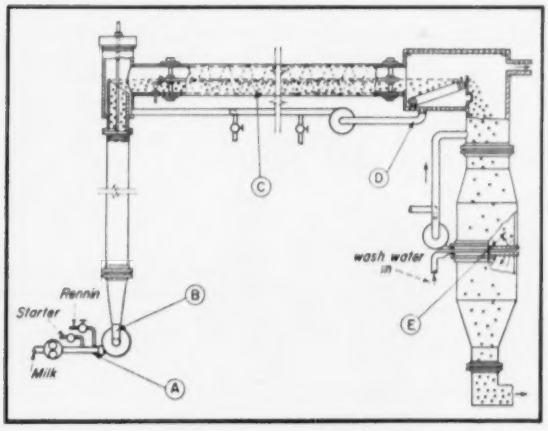
Valley Fresh

Western Condensing Company

Appleton, Wisconsin

A WORLD-WIDE SUPPLIER OF HIGH-QUALITY MILK DERIVATIVES

RECENT INVENTIONS



Manufacturing Cheese-Curd Continuously

Producing a cheese-making curd-coagulum continuously by introducing, into a moving stream of milk, an enzyme (A) capable of delayed reaction. Then, after violent agitation (B) to disperse the enzyme, causing coagulation to occur during axial movement in a relatively quiescent column (C), removing whey (D), washing (E).—W. J. Harper and D. A. Seiberling to The Ohio State University Research Foundation, Columbus, Ohio. No. 2,781,269. Feb. 12, 1957.

PRODUCTS

Fermentable Carbohydrate Having Higher Fatty Acid Amide of Amino Carboxylic Compound to Inhibit Acid Production.—W. J. King, River Edge, N. J. to Colgate-Palmolive Co. No. 2,772,168. Nov. 27, 1956.

Antioxidant for Meat Curing Comprising Gallic Ester, Ascorbic Acid, Phospholipoid.—L. A. Hall to Griffith Laboratories, Chicago. No. 2,272,169. Nov. 27, 1956.

Antioxidant Having Fatty Monoglyceride Citrate, Propyl Gallate, Water—L. A. Hall to Griffith Laboratories, Chicago. No. 2,772,170. Nov. 27, 1956.

Packaged Cake Mix and Frosting in Separate Packages, Cobbined in Single Container; Mix Comprising Emulsifier-Type Shortening, Flour, Sugar, Salt, and Baking Powder; Frosting Consisting of Shortening, Sugar —H. P. Montminy, Arlington, Mass. No. 2,772,171, Nov. 27, 1956.

Leavening Composition Comprising Sodium Bicarbonate, Metaphosphate—E. J. Griffith, Dayton, Ohio, to Monsanto Chemical Co., St. Louis. No. 2,774,672. Dec. 18, 1956.

Food Additive Including Proteolytic Vegetable Enzyme, Monosodium Glutamate, Purified Maize Carboyhydrates, Antioxidant Salt—R. H. Young, Wooster, Ohio. No. 2,774,673. Dec. 18, 1956.

Emulsifier Composed of Alcohol-Soluble Moiety of Vegetable Lecithin and at Least One Substance Having Hydrophylic and Lipophylic Groups—P. L. Julian, Oak Park, H. T. Iveson, Elmhurst, and S. B. Radlove, Chicago, Ill., to Glidden Co., Cleveland. No. 2,733,771. Dec. 11, 1956.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

PROCESSES

Deep Fat Cooking Under Pressure by Steps of Cooking Food In Oil Bath Until Brown, Cooking Under Pressure—C. Wagner, Eaton, Ohio. No. 2,778,736. Jan. 22, 1957.

Making Sparkling Beverage Type Jelly by Degasifying Beverage, Mixing With Pectins

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and Sugars, Heating, Cooling, Filling, Introducing Gas Bubbles—F. B. DuBridge, San Jose, Calif. No. 2,778,737. Jan. 22.

Recovering Lactose by Passing Whey Through Cation Exchange Material, Heating, Concentrating, Crystallizing—M. E. Hull, LaGrange to Armour and Co., Chicago, Ill. No. 2,778,750. Jan. 22, 1957.

Obtaining Starch From Mill Starch Liquor by Subjecting to Froth Flotation, Continuous Centrifugal Separation.—E. H. Williams, Glen Ellyn, Ill. to Corn Products Refining Co., New York City. No. 2,773,784. Dec. 11, 1956.

Preparing Pizza Shell by Placing a Flat Proofed Sheet of Dough on Heat Conducting Material, Leaving Exposed Border, Baking.—F. J. Daino, Ithaca, N. Y. No. 2,774,316. Dec. 18, 1956.

Producing Dry Vegetable Product Having Molasses Solids From High Water Content Vegetable Matter by Pressing, Mixing with Molasses, Permitting to Stand, Pressing, Drying.—No. 2,774,671. Dec. 18.

Purifying Sugar Juice by Adding Liming Reagent, Carbonating.—A. V. Brieghel-Muller, Gentofte, to Aktiesel Skabet de Danske, Sukkerfabrikker, Copenhagen, Denmark. No. 2,774,693. Dec. 18, 1956.

Descaling Sugar Evaporators by Treating With Hot Alkaline Solution of Sequestering Agent, Bringing pH to 2.5, Removing Precipitate, Making pH 11.—L. F. Wiggins, St. Augustine, Trinidad, British West Indies. No. 2,774,694. Dec. 18, 1956.

Fortifying Grain Products by Applying Vitamin C and Edible Higher Fatty Acid With Edible Water-Repellent.—M. Mateles, Nutley and P. F. Widmer, Hawthorne to Hoffman-La Roche, Inc., Nutley, N. J. No. 2,775,521. Dec. 25, 1956.

Manufacturing Beer by Cooling Wort to Below Freezing, Holding, Removing All Insoluble Material, Reheating.—M. W. Coutts to Dominion Breweries Ltd., Auckland, New Zealand. No. 2,775,522. Dec. 25, 1956.

Producing Dextran From Sucrose by Leuconostoc Fermentation in Yeast Beer.—E. L. Wimmer, Springfield and G. D. Lakata, Philadelphia, to American Sugar Refining Co., New York City. No. 2,775,540. Dec. 25, 1956.

Preparing a Confection by Grinding and Malaxating Roasted Peanuts, Mixing With Cocoa, Sugar, Rolling, Converting to Unctuous Paste—J. C. L. Bloch, Paris, France to Societe Industrielle de Produits Africains, Dakar, French West African Territory. No. 2,780,549. Feb. 5, 1957.

Preserving Fruits and Vegetables by Heating to Inactivate Surface Enzymes, Freezing—V. G. Guadagni, Lafayette, Calif., to USDA. No. 2,780,551. Feb. 5, 1957.

Drying Cooked Mashed Potatoes on Heated Surface in a Film of Monocellular Thickness—N. J. Willard, Jr., Glenside, Pa. and J. Cording, Jr., Philadelphia to USDA. No. 2,780,552. Feb. 5, 1957.

Processing Citrus Fruits by Making Incision in Rind, Forming an Opening Opposite Incision, Applying Pressure—W. C. Belk, and E. F. Frost, Jr., Lakeland, Fla. to Food Machy. & Chemical Corp., San Jose, Calif. No. 2,780,988. Feb. 12, 1957.

Concentrating Whey to About 50% Solids at 140F and 24 in. Mercury, Cooling, Agitating—E. Traisman, Des Plaines and H. L. Fleming, Palatine, Ill. to Kraft Foods Co., Chicago. No. 2,781,267. Feb. 12, 1957.

Making Mayonnaise Continuously by Forming Free-Flowing Mixture of Oil, Eggs, and Some Vinegar, Emulsifying, Pumping Slurry, Inert Gas, and Remainder of Vinegar Into Closed Chamber, Agitating Under Pressure—D. B. Crawford, Westfield, and C. W. Hirsch, Glen Rock, N. J. to American Machine & Foundry Co. No. 2,781,270. Feb. 12, 1957.

PACKAGING

Container With Cover of Manually Tearable Metal, Weakened by Opposed Lines, Forming a Tear Strip—W. E. Checley, Louisville, Ky., to Reynolds Co., Richmond, Va. No. 2,777,601, Jan. 15, 1957.

Cheese-Pump Filler Having Tubular Cylinder Divided Into Two Parts, With Reciprocating Plungers Mounted in Ends, Cylinder Rotating Means—

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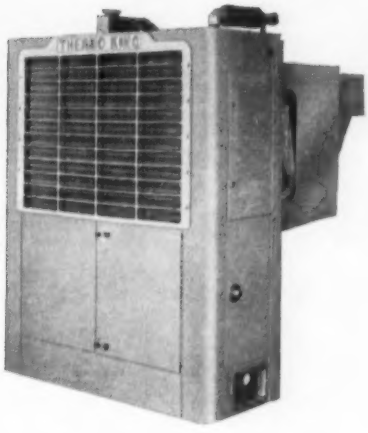

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S. Bowman, Glendale, Calif. No. 2,776,626. Jan. 8, 1957

Meat-Filling Unit Combining Tubular Carrier Element, Advancing Means, Manifold Having Loose Mounting.—W. Pechy, Belmar, N. J. to American Can Co., New York City. No. 2,771,916. Nov. 27, 1956.

Can Cover Loading Device for Automatically Distributing Covers.—W. D. Dubin and F. Wathne, Long Beach, Calif. No. 2,772,005. Nov. 27, 1956.

Frozen-Foods Container Comprising Rectangular Receptacle and Closure of Sulphite Board Having Polyethylene Film Adherent—F. E. Lederer, Chicago and B. M. Levin, Jr., Glencoe, Ill. No. 2,767,754. Oct. 23, 1956.

Container Having Posts to Form Abutments to Support a Similar Nestable Container Body Therein—D. W. Hill, Ladue, Mo. to Crown Cork & Seal Co., Inc., Baltimore. No. 2,767,755. Oct. 23, 1956.

Can End Testing Machine Feeding Device Combining Magazine for Can Ends, Testing Means.—B. L. Hoyne, Jersey City, N. J. to American Can Co., New York City. No. 2,773,380. Dec. 11, 1956.

Bottle Gripper Comprising Resilient Member Adapted to Engage Bottle and Center Below Valve.—G. I. N. Meyer, Milwaukee, to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,773,522. Dec. 11, 1956.

Producing a Stuffed Product by Forming Tubular Casing, Passing Plastic Foodstuff Into Casing, Sealing—C. L. Harder and H. H. Wright, Fredericksburg, Va. to American Viscose Corporation, Wilmington, Del. No. 2,773,773. Dec. 11, 1956.

Wrap Tightness Control Comprising Pair of Rollers, Friction Brake Retarding One Roller.—A. A. Kottmann, Davenport, Ia. to American Machine and Foundry Co., New York City. No. 2,775,085. Dec. 25, 1956.

Poultry Tray-Pack Wrapping Device Having Horizontal Support, Fixed Holding Member Whereby Tray May Be Wedged Between Member and Surface to Hold Wrapping Material in Place While Drawing About Tray—R. C. Kabrick, Jasper, Ind., to Swift & Co., Chicago. No. 2,780,045. Feb. 5, 1957.

Packaged Perishables in Ice by Supporting Bags Vertically Under Bottomless Compartment—B. R. Weingart, Mantua, Ohio. No. 2,781,066. Feb. 12, 1957.

Packaging Irregularly Shaped Foods Wherein Sealed End of Package is Adjacent One Straight Portion, by Steps of Positioning in Deformable Open End Plastic Bag-Like Container, Loosely Gathering Open End, Tying, Heating to Cause Shrinking, Hermetically Sealing—R. J. Weikert to General Films, Inc., Covington, Ohio. No. 2,783,599. Mar. 5, 1957.

Pickle Canning Machine Having Supply Station, Container Advancing Means, Gravity Food Feeding Means, Container Spinner to Urge Food in Containers in Erect Position, and Means for Jogging.—R. H. Eckart to Food Packers, Inc., Corydon, Ind. No. 2,775,268. Dec. 25, 1956.

EQUIPMENT

Fruit Deskinner Comprising Pair of Parallel, Upwardly Inclined, Endless Chains, Drive Means, Rollers and Cog Wheels Mounted Between Chains—R. C. Warren, Woodland, Calif. to Hershel California Fruit Products Co. Inc. No. 2,776,690. Jan. 8, 1957

Grain Unloader for Open Rear End of Vehicle.—D. B. McClellan, Dutton, Montana. No. 2,772,764. Dec. 4, 1956.

Viscous Liquid Transporting Tank Having Bottom Outlet, Clean-Out Means.—J. F. Cuphers, Milton and F. C. Doherty, Jamaica Plain, Mass. to General Foods Corp., New York City. No. 2,772,784. Dec. 4, 1956.

Bottle Rack Comprising Pan of Uniformly Spaced Arms, Lip Along Each Arm, Spacer-block.—T. O. Lee, Rumford, R. I. No. 2,772,787. Dec. 4, 1956.

Pan-Coating Apparatus Comprising Rotor Disk From Which Coating Compound is Flung Outward Onto Interior of Pans—L. D. Mallet, Pittsburgh, and R. R. Maccary, Export, Pa. to Mallet & Co., Inc., Pittsburgh. No. 2,781,022. Feb. 12, 1957.

Bean De-Hulling Unit Comprising Screw Conveyor, Flexible Tube Enclosing Portion of

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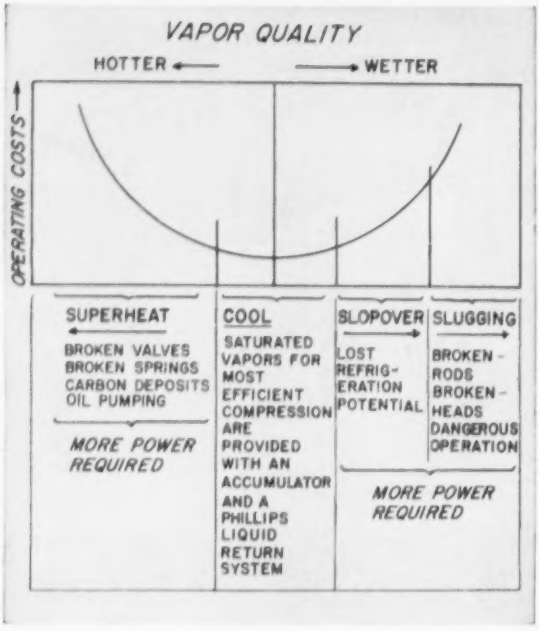

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Conveyor, Means for Applying Fluid Pressure to Outer Side of Tube to Force Inner Space Into Contact With Conveyor and Bean—E. O. Herman, Momence, Ill. No. 2,781,071. Feb. 12, 1957.

Seafood Cleaning Machine Rotates Shrimp Until Shell is Caught Between Roller and Platform and is Unwound From Shrimp—P. C. Skrmetta to H. J. Agregard, A. R. Rodriquez, and R. O. Skrmetta, New Orleans. No. 2,781,544. Feb. 19, 1957.

Milk Bottle Emptying Device Adapted to Swing 190 Deg. So That Contents of Bottles are Deposited in Tanks—L. Uhrich, Calgary, Canada. No. 2,781,929. Feb. 19, 1957.

Frozen Confection Conveying System Including Frame, Upper and Lower Longitudinally Reciprocal Members, Intermediate Conveyor, Loading Means, Article Pusher—L. J. Nauroth, Dallas, Tex., to Joe Lowe Corp., New York City. No. 2,782,945. Feb. 26, 1957.

Dough-Sheeting Roll Having Inner Metallic Core, Plastic Outer Sleeve Having Adhesive Factor With Respect to Dough Less Than Core and Expansion Factor Greater Than Core—H. C. Rhodes, Portland, Ore. to Capital Products Corp., Mechanicsburg, Pa. No. 2,783,719. Mar. 5, 1957.

Taco Cooking Machine Using Reel Having Work-Supporting Fingers Formed on Axially-Spaced Disks.—W. L. Contreras, Scottsdale, Arizona. No. 2,773,442. Dec. 11, 1956.

Pump Comprising Housing, Impellers, Two Guide Members, Electric Motor, Shaft, Inlet and Discharge Openings.—P. Berdelle-Hilge, P. Schreiner, W. Blessing and R. Stohr, to P. Hilge, Mainz (Rhine), Germany. No. 2,773,454. Dec. 11, 1956.

Sorting Apparatus Deriving Voltage Varying According to Physical Characteristics of Articles on Conveying Means.—H. W. Bartlett, Berkeley to California Packing Corp., San Francisco. No. 2,773,596. Dec. 11, 1956.

Mold Defroster Having Plunger, Mold Carrier, Confection Stick Holder, Defrosting Tank, Lowering Means.—M. Hughes, West Sacramento, Calif. No. 2,774,360. Dec. 18, 1956.

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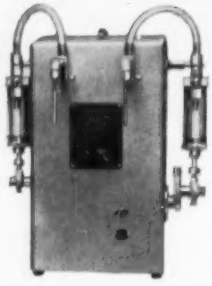

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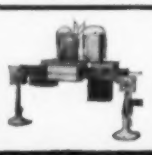

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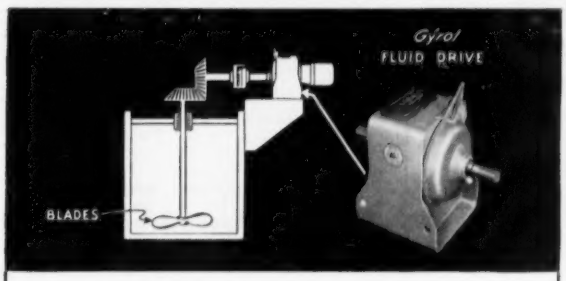

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8	43a	70e	115	139	161c	182a	186	202	213b
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These numbers correspond to numbers in text

20A	87C	92D	97C	173D	185E	191C	192D	195F	198J
20B	87D	92E	97D	174A	185F	191D	192E	195G	198K
20C	87E	92F	97E	174B	185G	191E	192F	195H	198L
20D	88A	92G	97F	177A	185H	191F	192G	195I	198M
22A	88B	92H	166A	178A	188A	191G	192H	195J	198N
22B	88C	94A	166B	181A	188B	191H	192I	195K	1960
22C	88D	94B	167A	181B	188C	191I	192J	195L	196P
22D	88E	94C	167B	181C	188D	191J	192K	195M	196Q
22E	88F	94D	167C	181D	188E	191K	192L	195N	196R
22F	91A	94E	169A	182A	188F	191L	192M	196A	199A
22G	91B	94F	169B	182B	188G	191M	192N	196B	199B
24A	91C	95A	169C	182C	188H	191N	192O	196C	199C
27A	91D	95B	171A	182D	188I	191O	192P	196D	199D
86A	91E	95C	171B	182E	188J	191P	195A	196E	199E
86B	91F	95D	171C	185A	188K	191Q	195B	196F	199F
86C	92A	95E	173A	185B	188L	192A	195C	196G	
87A	92B	97A	173B	185C	191A	192B	195D	196H	
87B	92C	97B	173C	185D	191B	192C	195E	196I	

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